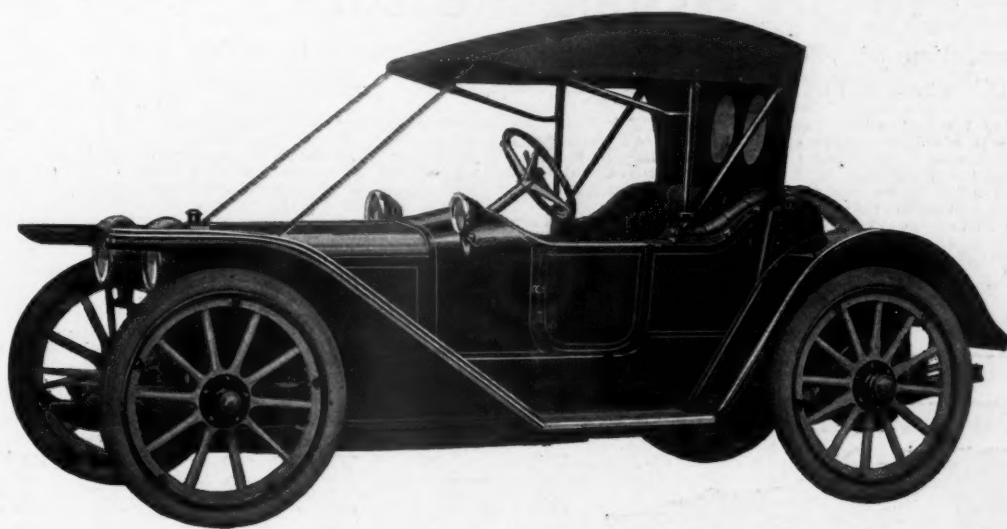


MOTOR AGE

VOLUME XXI

CHICAGO, JUNE 6, 1912

NUMBER 23



The "American Scout" (Type 22A), \$1425

Strictly a two-passenger car. Wheel base 105 in.; tires, 36x3½ in.; front and rear on Q. D. demountable rims. Regular equipment includes top and top boot; 5 lamps, dash and tail lights electric; Prest-O-Lite tank; high tension magneto and storage battery with coil; one extra rim; combination circular tire holder and luggage box; horn, jack, tools and tire-repair outfit.

The American Underslung

THE ATTEMPTED reproduction of the distinctive *American Underslung* style each season is the supreme evidence of its merit. Examine the American and you will see at once the increased power of the straight line drive which is the result of our Underslung construction. See how the frame is hung underneath the axle—not over, thereby transmitting shocks to the springs and not to the frame. Note the increased safety with the lowered center of gravity.

The practical advantages of this pioneer Un-

derslung car are evident throughout. Not only are power, comfort and safety increased many times, but the low hung frame also permits enlarged wheels. Every motorist knows they mean more comfort and greater tire economy.

These strong points are grouped in a car of low, stylish, distinctive design. It is the car you want. The American Underslung stands out in contrast to the many that are alike. It is the car for the dealer to sell—fundamentally different, but standing every test.

Write at once for book H.

The "American Traveler" (Type 56), \$4500

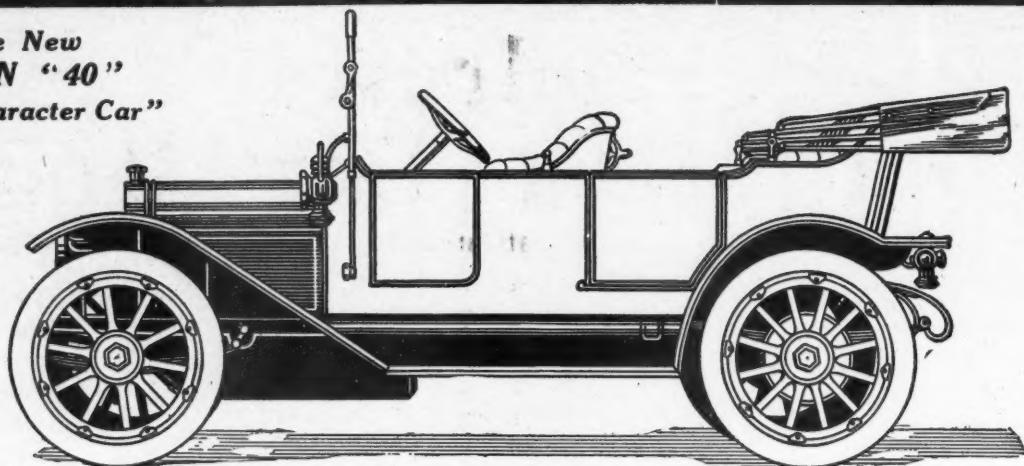
Six passengers. Wheel base 140 inches; tires, 41x4½ in., front and rear on demountable rims. Springs—Front, 40 in.; rear 54 in. Regular equipment includes top and top boot; 5 lamps, side and tail lights electric; Prest-O-Lite tank; Bosch magneto and storage battery; two extra rims; shock absorbers; foot rest; robe rail; horn, jack, tools and tire-repair outfit.

The "American Tourist" (Type 34), \$2250

Four passengers. Wheel base 118 in.; tires, 37x4 in.; front and rear on Q. D. demountable rims. Regular equipment includes top and top boot; 5 lamps, dash lights electric; Prest-O-Lite tank; Bosch magneto and storage battery; one extra rim; shock absorber; robe rail; foot rest; horn, jack, tools and tire-repair outfit.

American Motors Company, Indianapolis, Indiana

The New
MOON "40"
"The Character Car"



Model "40" Four-Passenger Torpedo—Price \$1,800

Good Measure

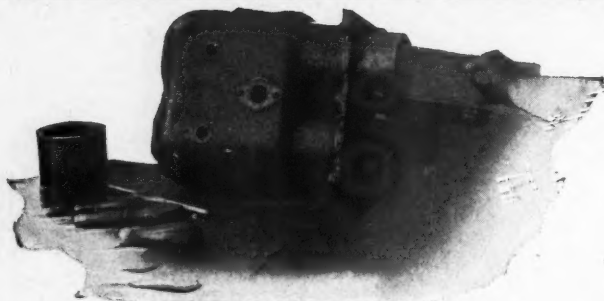
is the foundation of The Character Car. Our *plus* in strength, safety and luxury in the new Moon "40" amazes and delights the informed buyer — the most critical automobile sharp

We advertise 120-inch wheel base and deliver 121-inch—measure it. We sell a 40-horsepower car—we deliver 46 horsepower on actual brake test. Make the test yourself. Buyers have no reason to expect our steering and transmission gears, universal joints or back axles to be any stronger than the motor's horsepower—yet we guarantee them for 60 horsepower.

That *extra* 20 horsepower may earn its cost to us twenty times

over some day in a tight place. (It costs you nothing.) The Moon policy invariably delivers more than the buyer expects or pays for. Ask for a demonstration of the new Moon "40". A big, classy, noiseless car with modern T-head, long-stroke motor and luxurious fittings which you've always associated with cars of the highest prices. A postal to our office will bring you the 1912 catalog and the famous Moon Book of Charts.

MOON MOTOR CAR COMPANY
ST. LOUIS, MO.



"LAPPING IN BY HAND"

This one man with the use of a Heald Cylinder Grinding Machine has obtained an output per day that it would require several men to equal, if they used the Reaming and Lapping method, and has produced more accurate and better finished holes, than it would have been possible to obtain in the other way. How and why is explained in our booklet on "Cylinder Grinding." Copies sent free on request.

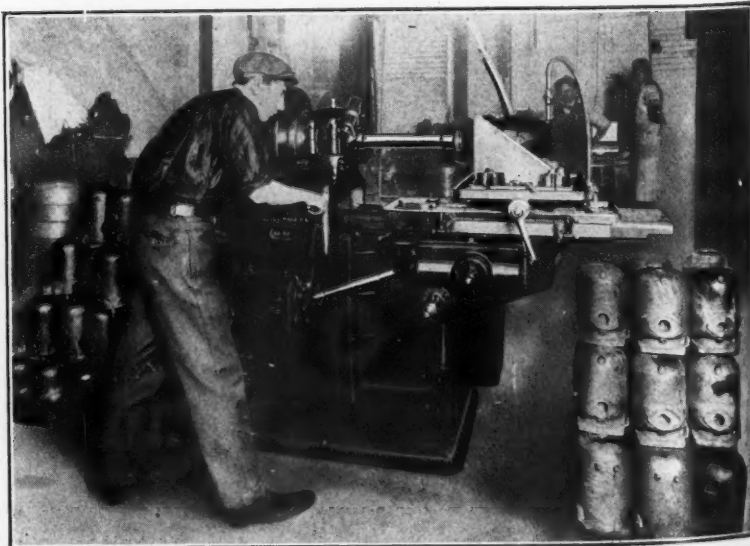
THE HEALD MACHINE CO.
26 NEW BOND ST. WORCESTER, MASS.

Here's Food For Thought

WASTED ENERGY

LOW EFFICIENCY

Some shops are still "lapping in" gas engine cylinders by hand, as the cut to the left shows, and are doing a lot of hard work to accomplish something that can be done better and easier another way, as shown in the following cut.





Published by the
CLASS JOURNAL COMPANY
910 South Michigan Avenue
CHICAGO ILLINOIS

Volume XXI

JUNE 6, 1912

No. 23

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MOTOR AGE LEADS

Figures confirm the fact that advertisers have long since found it pays best to advertise in MOTOR AGE.

It pays best because it is read most.

Over 20,000 buyers read Motor Age regularly each week.

Its readers are not only direct buyers, but are the greatest single influence for indirect sales in the automobile industry.

ADVERTISING IN LINES CARRIED IN THE CALENDAR YEAR OF 1911

	Paid Lines
Motor Age.....	2,486,820
The Automobile.....	2,313,360
Horseless Age.....	1,441,020
Motor World.....	1,136,100
Motor	972,720
Trade Journal.....	676,836

ADVERTISING IN LINES CARRIED FROM JAN. 1, 1912, TO APRIL 30, 1912

	Paid Lines
Motor Age.....	780,360
The Automobile.....	720,300
Horseless Age.....	529,600
Motor World.....	406,140
Motor	372,960

ADVERTISING IN PAGES CARRIED IN THE CALENDAR YEAR OF 1911

	Paid Pages
Motor Age.....	5,921
The Automobile.....	5,508
Horseless Age.....	3,431
Trade Journal.....	2,844
Motor World.....	2,705
Motor	1,930

ADVERTISING IN PAGES CARRIED FROM JAN. 1, 1912, TO APRIL 30, 1912

	Paid Pages
Motor Age.....	1,858
The Automobile.....	1,715
Horseless Age.....	1,261
Motor World.....	967
Motor	740

The Class Journal Company

910 South Michigan Ave.
Chicago, Ill.

The Length of Two Lives

THE life of the highest type of locomotive is estimated to be fifteen years. During that time it is in almost constant service. Breakdowns, repairs, mechanical troubles are foreign to its make-up.

It is an almost perfect piece of machinery, Made so by the greatest engineering skill of the age. *And so with the*

ALCO

Motor Cars

Built by the same brains and skill that make the highest type of locomotive, who shall say that this is not America's *superior* motor car?

What other makers may claim a half century's experience—the *engine building achievement*—which vitalizes every motor of Alco make.

Not one!

And an Alco car is just as beautiful and luxurious, as it is sure, swift, and safe.

Its length of life is yet unproven to us—and the first Alco started running six years ago. Good grounds for you to ask a demonstration!

AMERICAN LOCOMOTIVE COMPANY, 1895 Broadway, NEW YORK

Builders also of Alco Motor Trucks and Alco Taxicabs

Chicago Branch: 2501 Michigan Avenue.
Boston Branch: 567 Boylston Street.



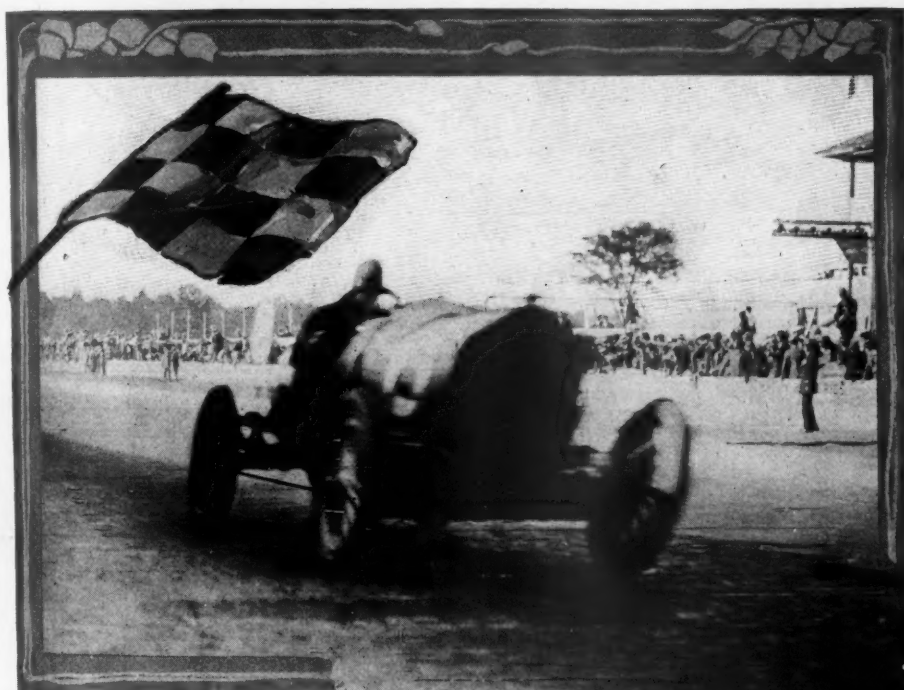
Twice winner of the race

Canadian Headquarters:
4280 St. Catherine Street, West, Montreal.

for the Vanderbilt Cup

MOTOR AGE

Five-Century Race to Dawson, National



THE FINISH OF DAWSON

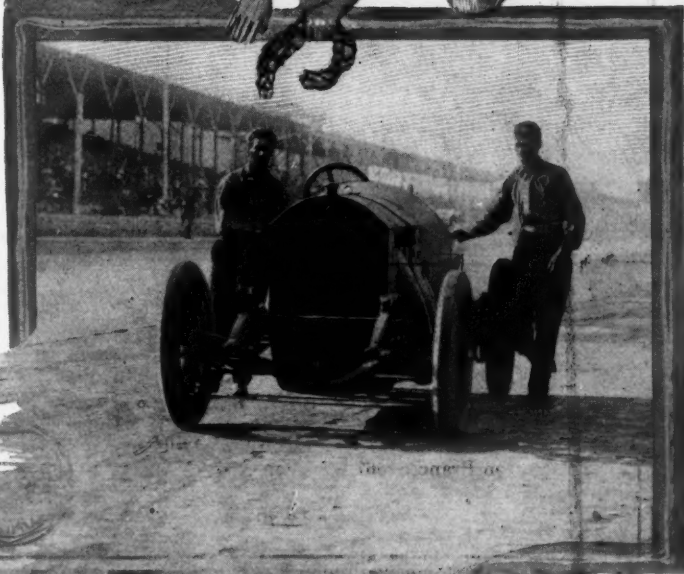
INDIANAPOLIS PRIZE WINNERS

No.	Car	Driver	Time	Speed
1	National	Dawson	6:21:06	78.7
2	Fiat	Tetzlaff	6:31:29	76.6
3	Mercer	Hughes	6:33:09	76.3
4	Stutz	Merz	6:34:40	76.0
5	Schacht	Endicott	6:46:28	73.3
6	Stutz	Zengel	6:50:28	73.0
7	White	Jenkins	6:52:38	72.7
8	Lozier	Horan	6:59:38	71.4
9	National	Wilcox	7:11:30	69.6
10	Knox	Mulford	8:53:00	56.2
11	Mercedes	DePalma	Did not finish	
12	Cutting	Burman	Did not finish	

Speedway Records Smashed from Start to Finish—De Palma Forced Out With Only Two Laps to Go—Ten of Twenty-Four Finish

INDIANAPOLIS, Ind., May 31—For the second time an Indianapolis-made car and an Indianapolis driver have captured the honors in the 500-mile race which has become the great American motoring classic, Joe Dawson driving a National, leading home a field composed of twenty-four cars, only ten of which finished in the 5-century grind on the speedway yesterday. Records were broken from the first to the last mile and a crowd, estimated as larger than last year, paid \$180,000 to see the spectacle.

Second to Dawson in the National was Teddy Tetzlaff in a Fiat, holder of the world's road record, while following in the order named were Hughes in the Mercer, Merz in a Stutz, Endicott in a Schacht, Zengel in a Stutz, Jenkins in a White, Horan in a Lozier, Wilcox in a National and Mulford in a Knox, the last-named so far in the rear that he did not finish the long grind until 2 hours after the winner was known. It was necessary for Mulford to finish, for there were twelve



THE FINISH OF DE PALMA

prizes. As only ten finished, the eleventh and twelfth prizes will go to de Palma of the Mercedes and Burman of the Cutting, the two with the greatest mileages among the also rans.

Race Glory de Palma's

Although Dawson was the winner of the race, the glory was de Palma's, for the Mercedes pilot was robbed of what appeared to be almost certain victory by the failure of his engine when there remained only a little over two more laps to go. Leading from the start and smashing records at every milestone, the Italian was 11 minutes ahead of Dawson at the time one of the pistons broke. Starting on his third from last lap, de Palma swung into the backstretch with the Mercedes hitting only on two cylinders and running at less than 30 miles an hour. Slower and slower the gray car became until at the 1½ mile post it stopped altogether. Dawson was quick to discover the troubles of the rival who had showed him a clean pair of heels for so long and opening the throttle to its widest, taking the turns regardless of possible tire trouble, he started his run for the front.

The crowd by this time was awake to the possibility of an American victory and



DAWSON, THE WINNER

HUGHES, THIRD PLACE

180,000 pairs of eyes watched the far turn for the appearance of de Palma. Seconds

slipped into eternity and still no Mercedes. The National was eating up the ground and

UNOFFICIAL TABLE OF TIMES AT 20-MILE INTERVALS TAKEN BY WARNER ELECTRICAL TIMER IN 500-MILE

No. Car	Driver	Bore and Stroke		8th Lap 20 Miles	16th Lap 40 Miles	24th Lap 60 Miles	32d Lap 80 Miles	40th Lap 100 Miles	48th Lap 120 Miles	56th Lap 140 Miles	64th Lap 160 Miles	72d Lap 180 Miles	80th Lap 200 Miles
8 National	Dawson	5 x6¼	{ Elapsed time.... 14:55	29:45	44:32	59:23	74:24	89:15	103:48	118:21	132:49	149:06	167:19
3 Fiat	Tetzlaff	5 x7½	{ Lap time..... 14:50	14:50	14:47	14:49	15:01	14:51	14:33	14:33	14:28	14:33	14:33
			{ Elapsed time.... 14:49	29:48	44:31	59:08	73:37	88:10	102:40	117:05	131:32	147:33	163:33
			{ Lap time..... 14:59	14:53	14:37	14:29	14:33	14:30	14:30	14:25	14:28	14:28	14:31
21 Mercer	Hughes	4¾x5	{ Elapsed time.... 15:05	30:01	44:50	61:15	75:16	89:18	107:37	122:37	137:45	152:40	167:37
			{ Lap time..... 14:56	14:56	16:25	14:01	14:01	14:02	18:19	15:00	15:08	15:08	15:08
20 Stutz	Merz	4¾x5½	{ Elapsed time.... 15:42	31:07	46:35	62:08	75:41	91:10	110:27	126:01	141:30	156:53	172:16
			{ Lap time..... 15:25	15:28	15:33	13:33	15:29	15:29	19:17	15:34	15:29	15:29	15:29
18 Schacht	Wm. Endicott	4¾x5½	{ Elapsed time.... 16:15	32:23	48:33	68:38	84:38	100:34	116:30	133:26	152:16	167:29	182:37
			{ Lap time..... 16:18	16:18	16:10	20:05	16:00	15:56	15:56	16:46	18:50	15:51	15:51
2 Stutz	Zengel	4¾x5½	{ Elapsed time.... 15:20	32:39	53:34	68:33	85:47	101:01	118:47	137:28	152:51	169:53	186:55
			{ Lap time..... 17:19	20:45	14:59	17:14	15:14	17:46	18:41	15:23	17:09	17:09	17:09
14 White Six	Jenkins	4¾x5¾	{ Elapsed time.... 15:31	30:38	46:03	61:05	76:19	91:41	111:46	130:40	149:44	168:48	187:52
			{ Lap time..... 15:07	15:07	15:25	15:02	15:02	15:14	20:22	15:05	18:54	15:05	15:05
22 Lozier	Horan	5¾x6	{ Elapsed time.... 15:20	30:33	46:03	61:31	77:21	93:24	110:07	125:47	141:33	157:19	173:05
			{ Lap time..... 15:13	15:13	15:30	15:28	15:28	15:50	17:03	15:43	15:40	15:40	15:40
9 National	Wilcox	5 x7½	{ Elapsed time.... 14:52	29:51	44:53	59:56	74:59	89:62	104:65	119:68	134:71	149:74	164:77
			{ Lap time..... 14:54	29:58	45:02	60:06	75:10	90:14	105:18	120:22	135:26	150:30	165:34
19 Knox six	Mulford	4.8x5½	{ Elapsed time.... 14:54	29:58	45:02	60:06	75:10	90:14	105:18	120:22	135:26	150:30	165:34
			{ Lap time..... 14:34	14:34	18:06	14:23	17:27	17:05	23:45	17:01	16:10	16:10	16:10
4 Mercedes	De Palma	5.2x7.06	{ Elapsed time.... 14:38	29:19	43:59	58:33	73:01	87:26	101:52	116:15	130:36	144:57	159:18
			{ Lap time..... 14:41	14:41	14:40	14:24	14:28	14:25	14:26	14:23	14:11	14:11	14:11
15 Cutting	Burman	5 7/32x7	{ Elapsed time.... 15:18	30:33	45:49	60:40	75:45	90:39	105:34	120:29	135:24	150:19	165:14
			{ Lap time..... 15:15	15:15	15:16	14:51	17:05	15:45	18:54	15:00	15:02	15:02	15:02
7 Mercedes	Wishart	5½x7 5/64	{ Elapsed time.... 14:40	32:48	47:39	62:30	77:21	92:20	108:25	123:20	138:09	153:09	168:09
			{ Lap time..... 18:08	18:08	14:51	14:51	14:41	14:59	16:05	14:55	14:49	14:49	14:49
12 Simplex	Dingley	5¾x5¾	{ Elapsed time.... 14:55	30:32	46:03	61:33	77:04	92:35	108:06	123:37	139:08	154:39	169:70
			{ Lap time..... 15:37	23:31	15:33	19:42	18:55	15:26	19:35	15:59	15:59	15:59	15:59
25 Lozier	Matson	5½x6	{ Elapsed time.... 15:29	30:31	45:00	60:12	75:24	90:36	105:48	121:00	136:12	151:24	166:36
			{ Lap time..... 15:02	15:02	18:29	16:12	21:42	16:01	16:14	17:00	20:20	20:20	20:20
1 Stutz	Anderson	4¾x5½	{ Elapsed time.... 15:40	30:56	47:48	62:52	78:10	93:39	110:43	125:31	140:30	155:29	170:28
			{ Lap time..... 15:16	15:16	16:45	15:04	15:18	17:29	15:04	14:48	14:59	14:59	14:59
17 Marquette-Buick	Liesaw	4½x5	{ Elapsed time.... 15:51	31:55	47:30	63:42	80:35	96:21	112:12	128:14	144:16	160:18	176:20
			{ Lap time..... 15:14	15:14	15:54	14:12	16:23	15:46	15:51	16:02	16:02	16:02	16:02
5 Case	Disbrow	5 11/64x7 5/64	{ Elapsed time.... 15:21	34:03	50:10	65:51	81:51	97:51	113:42	129:44	217:21	(?)	(?)
			{ Lap time..... 18:32	16:07	27:41	20:60	15:51	15:51	15:02	27:37	(?)	(?)	(?)
23 McFarlan six	Marquette	4¾x5	{ Elapsed time.... 17:39	33:27	49:11	64:19	80:21	95:41	110:57	126:13	141:29	156:45	172:01
			{ Lap time..... 15:46	15:46	15:34	15:38	15:12	15:20	15:16	15:16	15:16	15:16	15:16
6 Case six	Hearne	4 23/64x5	{ Elapsed time.... 15:45	34:43	54:38	71:12	88:01	105:05	122:05	139:10	156:15	173:20	190:25
			{ Lap time..... 18:57	19:45	16:34	16:49	21:04	21:04	21:04	21:04	21:04	21:04	21:04
16 Firestone-Col.	Kickenbacher	5 x5½	{ Elapsed time.... 15:46	30:57	48:01	61:32	76:45	91:58	107:11	122:24	137:37	152:50	168:03
			{ Lap time..... 15:11	15:11	17:04	13:31	15:13	15:13	15:13	15:13	15:13	15:13	15:13
29 National	Bruce-Brown	5 x7½	{ Elapsed time.... 15:40	29:20	43:59	58:01	72:44	87:27	102:10	116:53	131:36	146:19	161:02
			{ Lap time..... 14:40	14:40	14:40	14:40	14:40	14:40	14:40	14:40	14:40	14:40	14:40
10 Lexington six	Knight	4½x6¼	{ Elapsed time....	Out in 7th lap; connecting rod broken, gas tank loose									
24 Opel	Ormsby	4½x6¾	{ Elapsed time....	Out in 6th lap; cylinder head blew off									

(*) Out in 79th lap; broke a wheel and upset
(†) Out in 72d lap; cylinder head on fire

(‡) Out in 67th lap; burned out connecting rod bearing
(§) Out in 197th lap; broken piston



TETZLAFF, SECOND IN RACE

MERZ, WHO RAN FOURTH

at every revolution of the wheels victory became nearer. Finally Starter Wagner

crossed the track with his green flag and waved it at the approaching Dawson. Still

de Palma and the National swung into its lap a certain winner unless overtaken by a fate like that of the Mercedes. But the checkered flag finally waved and again it was an American triumph—again it had been demonstrated that size for size the Yankee cars possess greater stamina at a distance than their foreign rivals.

Finish Arouses Spectators

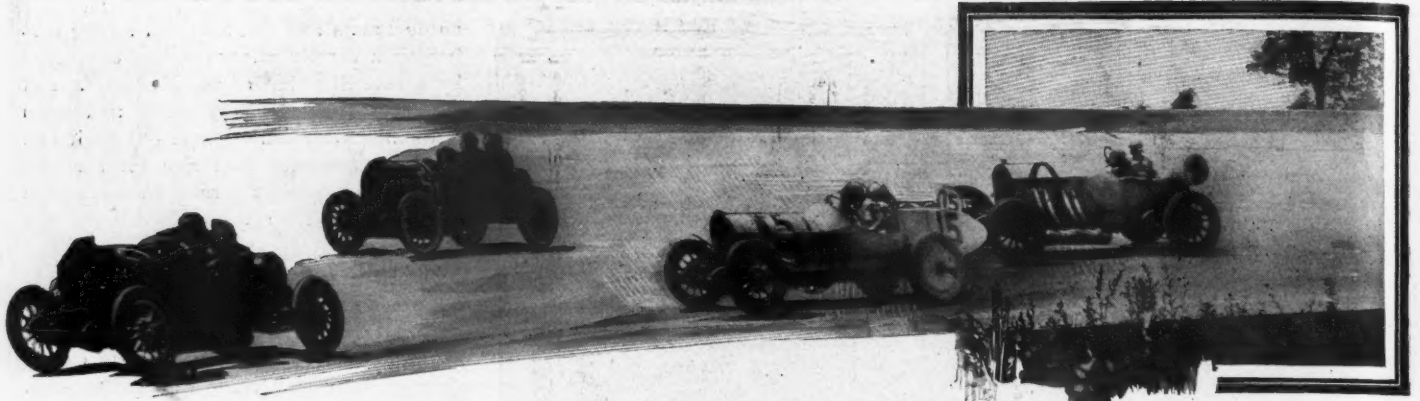
Notwithstanding their great glee over the success of Dawson, the spectators still were interested in de Palma and many hoped he would at least get second out of the race, to reward him for his gallant run. But car after car got the green flag, then the checkered one and still no Mercedes. Finally around the last turn the gray bonnet showed but it only was a crawl. There was no roar of exhaust, no skid on the corner, for gasoline was not furnishing the motive power—the car was being propelled by the weary de Palma and his mechanic Jeffkins, the driver steering and pushing and the helper shoving from the rear.

Inch by inch they came and as they neared the pits one could read the tragedy in de Palma's face, from which the perspiration was running in big beads. It isn't given to many men to let a \$20,000 prize slip through their fingers in this man-

RACE AT INDIANAPOLIS WON BY JOE DAWSON IN NATIONAL AT SPEED OF 78.7 MILES PER HOUR

88th Lap 220 Miles	96th Lap 240 Miles	104th Lap 260 Miles	112th Lap 280 Miles	120th Lap 300 Miles	128th Lap 320 Miles	136th Lap 340 Miles	144th Lap 360 Miles	152d Lap 380 Miles	160th Lap 400 Miles	168th Lap 420 Miles	176th Lap 440 Miles	184th Lap 460 Miles	192d Lap 480 Miles	200th Lap 500 Miles
167:19	183:03	196:19	214:19	228:50	243:14	259:39	277:13	291:32	304:14	318:46	336:17	351:39	366:50	381:06
16:18	16:17	12:43	18:00	14:31	14:24	15:85	17:34	14:19	12:42	14:32	15:22	15:22	15:11	14:16
147:31	167:24	181:49	196:16	210:51	238:52	263:14	282:36	299:01	319:01	333:28	346:10	361:25	375:55	391:29
16:19	19:33	14:25	14:27	14:35	28:01	14:34	19:22	16:25	20:00	14:27	15:15	15:15	14:30	15:24
152:48	167:50	182:48	202:48	217:50	235:24	253:51	269:00	285:36	300:25	316:37	331:33	346:41	361:57	378:47
15:40	15:02	14:58	19:54	15:08	14:24	18:27	15:09	16:35	14:49	16:12	14:56	15:08	15:16	16:50
156:53	172:30	187:50	203:07	220:26	236:22	251:28	266:27	285:00	300:13	318:14	333:37	348:49	364:17	379:28
15:23	15:27	15:20	15:17	17:19	15:56	15:06	14:59	18:33	15:13	18:01	15:23	15:12	15:28	15:11
167:38	182:31	197:41	212:42	232:13	247:19	264:04	273:37	290:19	308:19	324:29	340:33	356:40	372:53	390:50
15:12	15:03	15:10	15:10	19:31	15:06	15:45	9:33	16:52	18:00	16:10	16:04	16:07	16:15	15:55
169:57	185:11	200:10	215:23	239:29	247:18	262:49	283:01	298:03	316:11	330:56	345:00	363:46	378:35	393:24
17:08	15:14	14:59	15:13	14:06	15:31	20:12	15:02	28:08	14:45	14:44	14:44	18:46	14:49	15:07
145:43	160:45	179:10	194:18	226:56	242:44	260:08	275:18	290:24	310:18	327:15	342:20	358:20	373:58	393:07
15:03	15:02	18:30	15:08	15:37	15:48	17:24	15:10	15:06	19:54	16:57	15:05	16:31	15:07	19:09
141:31	157:25	179:44	195:45	229:00	244:44	260:59	277:06	298:03	316:56	333:58	350:57	367:12	384:57	401:25
15:44	15:54	22:19	16:01	17:36	15:44	16:15	16:07	20:57	18:53	17:01	17:00	16:15	17:45	16:23
191:50	210:30	225:39	243:53	258:57	273:57	292:07	307:21	323:50	338:36	350:32	363:34	381:48	399:09	414:49
24:29	18:40	15:09	18:14	15:04	15:00	18:10	15:14	16:29	14:46	11:56	19:58	16:14	17:21	15:40
144:47	254:19	271:54	294:48	308:34	327:06	345:30	363:47	382:06	401:20	421:56	442:38	.....	.....	.....
14:23	59:18	17:35	22:56	13:46	18:32	28:24	18:17	18:29	19:14	20:36	22:42	.....	.....	.....
14:23	160:41	176:22	190:50	206:53	223:21	237:44	252:17	266:53	281:42	296:34	312:27	327:10	343:14	358:16
15:47	15:54	15:31	14:28	16:03	16:18	14:73	14:33	14:36	14:49	14:52	15:53	15:17	16:04	15:02
15:00	171:41	186:26	199:23	277:56	292:39	259:53	267:21	284:02	298:01	Out in 156th lap	.....	.....	.....	.....
13:14	15:45	14:57	16:33	14:43	17:54	21:41	14:59	Car turned over	.....	.....	.....	.....	.....	.....
155:19	Out in 82d lap	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
17:30	Broken water connections	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
185:11	200:56	223:57	265:51	265:51	Out in 116th lap	.....	.....	.....	.....	.....	.....	.....	.....	.....
15:40	15:45	23:01	16:12	15:42	Broken connecting rod	.....	.....	.....	.....	.....	.....	.....	.....	.....
182:33	206:08	224:13	239:30	.....	Out in 107th lap	.....	.....	.....	.....	.....	.....	.....	.....	.....
24:27	23:13	16:05	15:17	.....	Connecting rod bearing burned out	.....	.....	.....	.....	.....	.....	.....	.....	.....

Note—This table is unofficial in that it has not been checked over by C. H. Warner, Official Timer. These times are practically correct except in a few instances. The official table will be published next week.



WILCOX, TETZLAFF, BURMAN AND DE PALMA IN THE ORDER NAMED

ner and the spectators could appreciate de Palma's feelings. But the Italian was game—dead game, too—and as he pushed the car across the tape he simply said that it all was part of the game and that he congratulated Dawson. He still had 5 miles to go but inasmuch as it would have been impossible to have beaten anyone but Mulford by pushing the car, de Palma was content to retire.

Good Race by Dawson

As one spectator put it, the feature of the race was not the victory of Dawson but the defeat of de Palma, and so it would seem. But nevertheless the National pilot, loaned for the occasion by the Marmon company, is entitled to great credit for driving a heady race and being close enough to take advantage of his rival's mishap. Taking 300 miles to get into the position of runner-up to de Palma, the Indianapolis pilot kept the place by careful driving and fighting off so brilliant a driver as Tetzlaff, while for a major portion of the journey Bob Burman in the Cutting was barking at his heels.

No Serious Accidents

If any of the 180,000 spectators were attracted to the race yesterday by the chance of seeing accidents similar to those which marred last year's race they were

doomed to disappointment, for it was one of the cleanest contests ever run on the speedway. Save for the accident to Burman in the Cutting, caused by the collapse of the right rear wheel and followed by an upset, there was not the semblance of a serious mishap. Marquette in the McFarlan might have been hurt when all four of his wheels went down, but he got away without a mark. Burman was cut up some and had a marvelous escape but he bemoaned more the fact he was put out when he had such a fine chance. He was only 28 seconds back of Dawson at 168 laps when his accident occurred.

Start of the Race

The start of the struggle was more picturesque even than last year, although the field was smaller. Twenty-four of the twenty-seven cars entered came to the tape, those scratched being the Mason, Shambaugh and Continental, all of which failed to qualify. It looked for a time as if Disbrow would be unable to get his Case to the tape, but at the last moment he swung into the line and faced the starter. As usual Carl Fisher in his Stoddard-Dayton set the pace for the preliminary lap and before the circuit was completed he had the field under full steam and well strung out, with de Palma, Tetzlaff and

Dawson showing the way and the field well bunched.



BOB BURMAN, CUTTING PILOT

It did not take long to get the pack under way and soon the speedy Tetzlaff found plenty of company up in front.

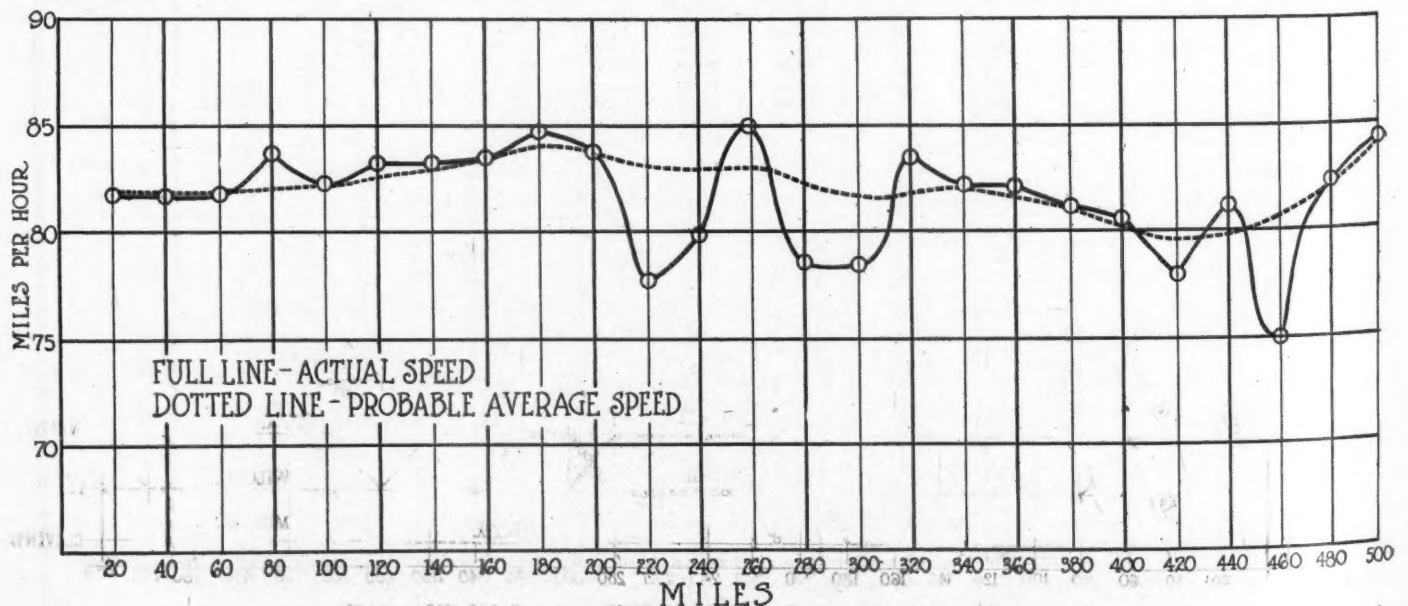


CHART SHOWING HOW SPEED OF LEADER VARIED EACH 20 MILES IN 500-MILE RACE

RELATIVE POSITIONS OF CARS AT EACH 20 MILES OF 500-MILE RACE

No.	Car and Driver	Start	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500
8	National, Dawson.....	7	7	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
3	Fiat, Tetzlaff.....	3	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
21	Mercer, Hughes.....	17	9	6	5	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
28	Stutz, Merz.....	22	17	14	9	10	4	5	7	8	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
18	Schacht, Endicott.....	15	21	16	15	17	15	14	13	12	12	10	9	9	9	9	10	10	10	10	10	10	10	10	10	10	10
2	Stutz, Zengel.....	2	12	17	19	16	16	15	14	14	13	11	10	10	10	10	10	9	9	9	9	9	9	9	9	9	9
14	White, Jenkins.....	11	14	11	7	5	5	13	10	11	11	9	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
22	Lozier, Horan.....	18	11	9	8	7	8	7	6	7	8	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	National, Wilcox.....	8	5	22	22	21	21	20	19	16	16	14	13	13	12	11	11	11	11	11	11	11	10	10	10	10	10
19	Knox, Mulford.....	16	6	3	11	9	12	11	15	13	14	15	14	14	14	13	12	12	12	12	12	12	11	11	11	11	10
4	Mercedes, De Palma.....	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	Cutting, Burman.....	12	10	10	6	4	10	8	12	10	9	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
12	Simplex, Dingley.....	8	7	20	18	20	19	18	17	17	13	11	11	11	13	12	12	12	12	12	12	12	12	12	12	12	12
25	Lozier, Matson.....	21	13	8	16	15	18	16	16	15	15	15	12	12	11	11	11	11	11	11	11	11	11	11	11	11	11
7	Mercedes, Wishart.....	6	2	18	12	11	9	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
1	Stutz, Anderson.....	1	16	12	13	12	11	9	8	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
17	Marquette-Buick, Liesaw.....	14	19	15	10	13	14	12	11	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
5	Case, Disbrow.....	23	15	20	18	20	19	18	17	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
23	McFarlan, Marquette.....	19	22	19	17	14	13	10	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
6	Case, Hearne.....	5	18	21	21	19	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
16	Firestone, Rickenbacher.....	13	20	13	14	8	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
29	National, Bruce-Brown.....	24	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
24	Opel, Ormsby.....	20	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
10	Lexington, Knight.....	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9



DE PALMA, SPEED HERO OF RACE

DePalma was fighting for the lead while big Bruce-Brown came in the rear of the bunch and soon was one of the contenders. By the time the fourth lap was finished both the Mercedes cars had passed the Fiat and Tetzlaff found himself in third position with Wilcox fourth, Bruce-Brown fifth and Dawson sixth. Before the end of the fifth lap five of the leaders had lapped the tail-enders, while in the sixth lap the foreigners were showing the way to Bruce-Brown in the National who had gained slightly on Tetzlaff and Wilcox. Even at this stage of the proceedings it was clearly apparent that all sorts of records were to be smashed before the winner was decided.

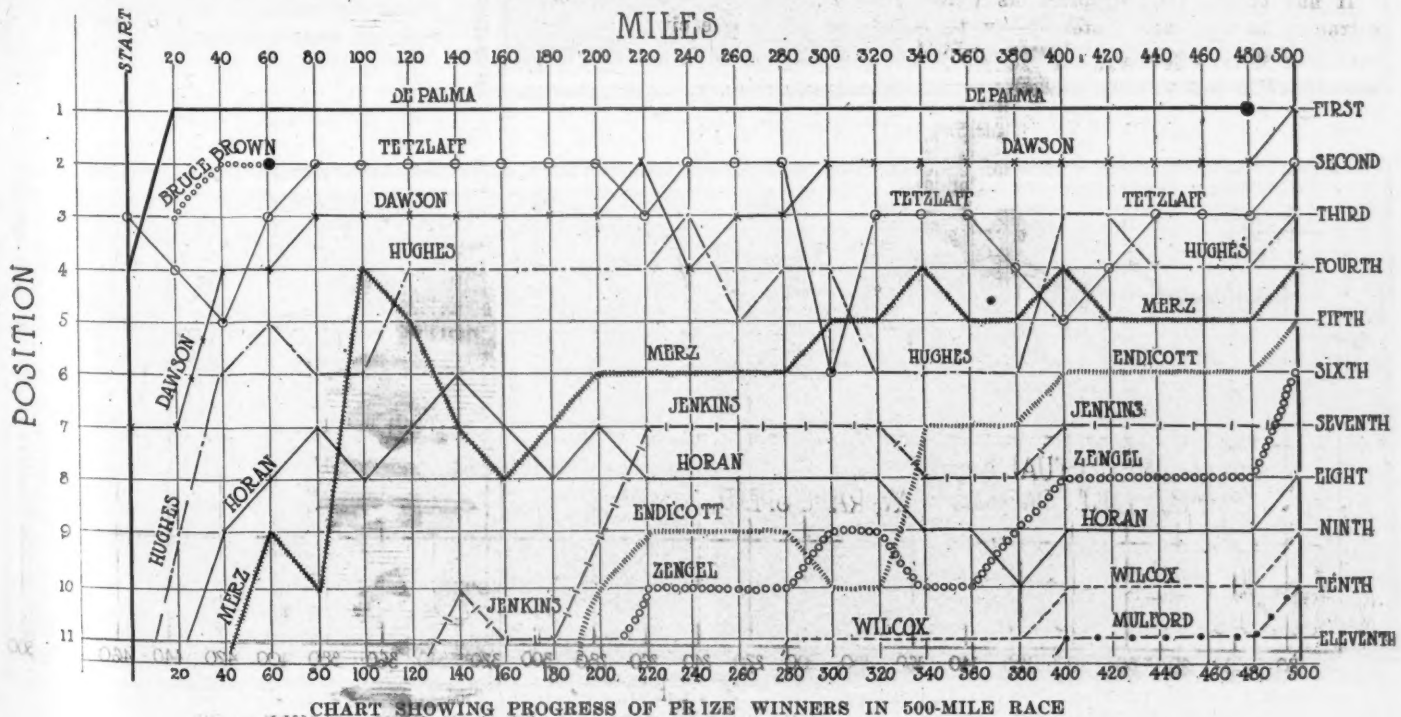
Lexington and Opel Out

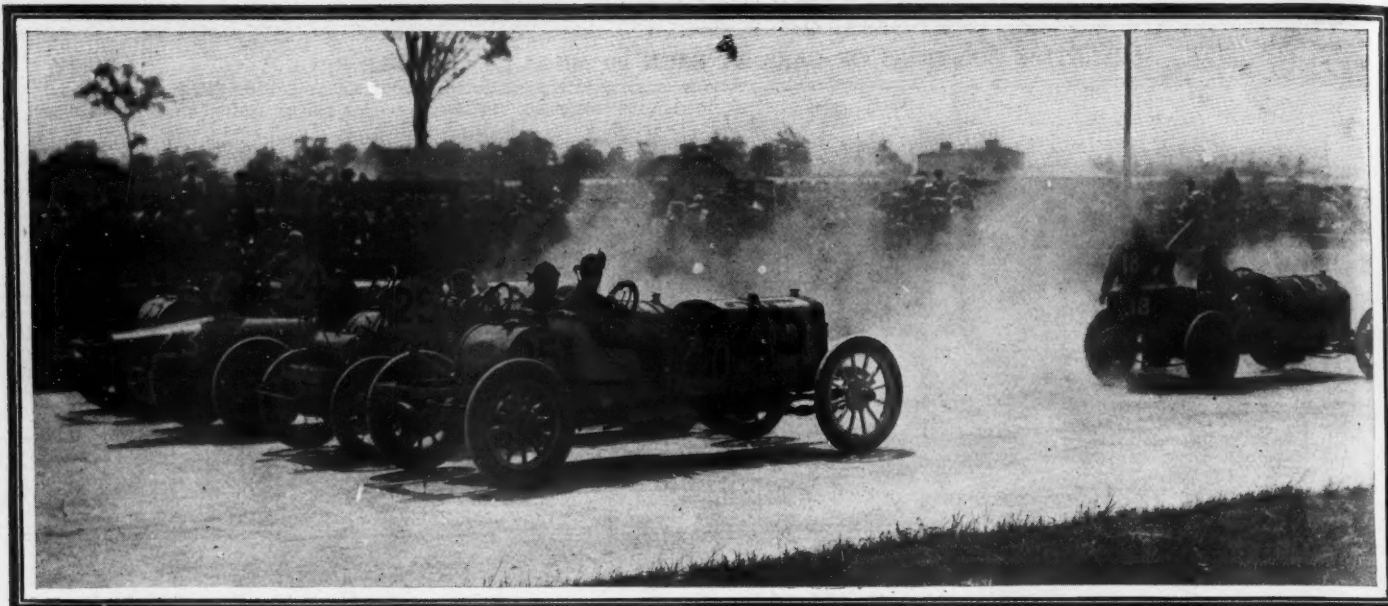
It was in this lap that the first of the pack dropped out, the Lexington going to the pits for keeps because of a cylinder blowing out. In the next lap the Opel also took the count because of a broken connecting rod and a loose gasoline line. Shortly after Bruce-Brown who had all

the ear-marks of a contender was forced out of the race because of the breaking of a piston ring. This left de Palma out in front which position he maintained until the one hundred and ninety-seventh lap when engine trouble robbed him of his apparent victory.

De Palma Early Leader

At the end of the eighth lap the first 20 miles of the long journey had been completed and the score board showed that de Palma had the lead by a scant two seconds over Wishart and Bruce-Brown while Tetzlaff, Dawson and Dingley, were well up. The first quarter-century showed two Mercedes, three Nationals and the Fiat as the front runners with the Schacht a lap behind and maintaining a steady pace. Wilcox had dropped out of the leading bunch because of a broken valve. At 30 miles the order was de Palma, Brown and Wishart, who had a lead of several hundred yards on Dawson and Tetzlaff. While de Palma was still the leader at the end of the thirteenth





TWO LOZIER'S STARTED IN THIS SQUAD, MATSON, NO. 25, ON OUTSIDE, AND HORAN, 22, ON POLE

lap, Mulford in the Knox had begun to work his way up into the pack. Tetzlaff and Dawson were still running second and third and a mile back of them was Hughes in the Mercer and back of him a quarter of a mile were the Stutzes, Loziers, Cutting, White and Simplex.

Fast Pace Begins to Tell

The fast pace of the leaders began to tell at the end of the fourteenth lap and Wishart stopped to change tires, leaving

de Palma and Brown as the pace-makers while the second group included Tetzlaff and Dawson. In between the first and second bunches was the Mercer. There were few changes in position up to the end of the twenty-sixth lap when Bruce-Brown was put out of the running. The Simplex had valve trouble and as Matson's Lozier also had to make a stop; this pulled three of the candidates out of the running, two of them only temporarily.

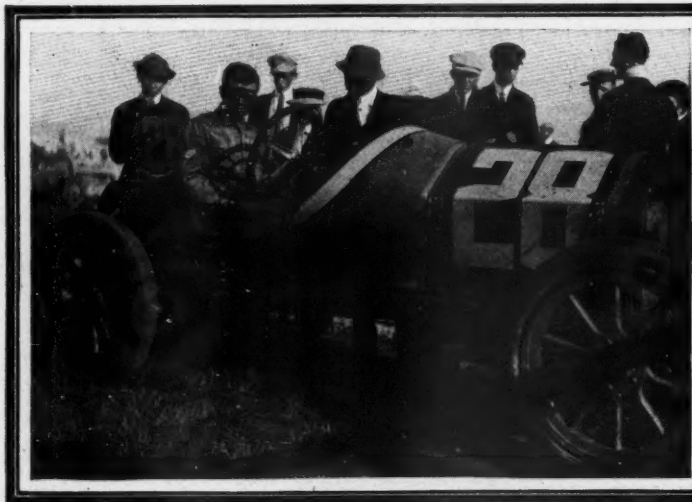
From this point on to the end of the first century there was nothing at all sensational and as de Palma turned the first hundred miles the watches showed that he had a lead of 36 seconds on Tetzlaff and 93 seconds on Dawson. Merz in a Stutz had come from the rear and was in fourth place, while Horan in a Lozier also had improved his position. At the turn into the second century, the order was de Palma, Tetzlaff, Dawson and Hughes with an interval of 8 minutes between de Palma and Hughes while Jenkins in the White had climbed to seventh place. From 200 to 300 miles it still was de Palma, but in this stretch Dawson worked into second place from which position he was ousted temporarily by Tetzlaff only to regain it again at 300 miles. Hughes was unchanged and back of him were Merz and Jenkins while Zengel had passed Endicott.

Positions Well Established

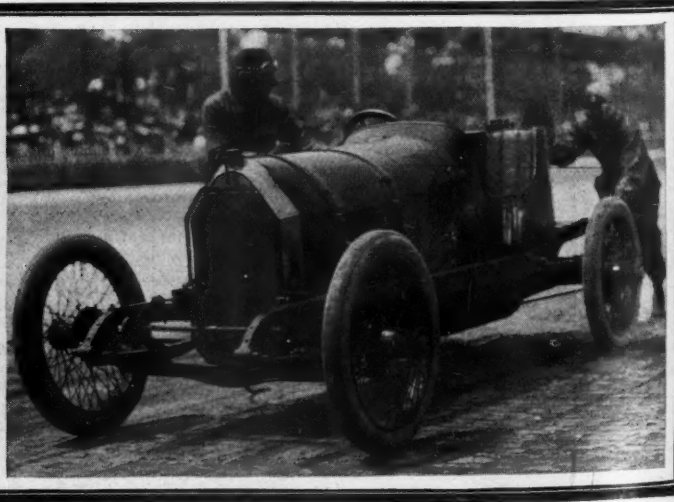
By this time it was pretty well established that barring accidents de Palma could not be ousted from his position up



TWO OF THE STUTZES AT PIT BEFORE START



MERZ IN STUTZ THAT FINISHED FOURTH



HUGHES PUSHING MERCER WHEN HE RAN OUT OF GASOLINE

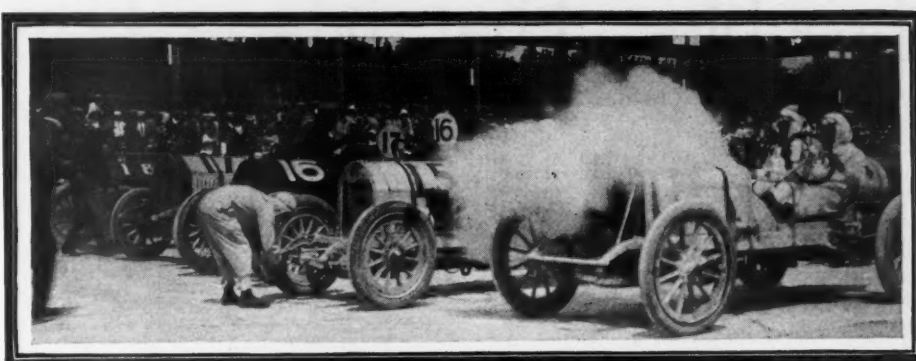


MECHANICS FIND STRAP NECESSARY TO HELP TURN OVER KNOX MOTOR

in front, and as the 400-mile post was turned the gray Mercedes still was in front and still Dawson was chasing him. Tetzlaff had had gasoline trouble and while he was at the pits he was passed by both Hughes and Merz. Endicott in the Shaht was sixth, the White, seventh, Stutz, eighth, Horan, ninth, Wilcox, tenth and Mulford, eleventh. This order was disturbed in the last century by the unexpected elimination of de Palma, while Zengel in the Stutz passed Jenkins in the White.

Stops for Tire Troubles

So much for the actual running of the race itself, but the aftermath of the struggle shows interesting dope as to the time made and the stops made necessary because of tire trouble. Neither de Palma nor Dawson stopped to change tires before 200 miles but they were exceptions to the rule for the records of Chairman Edwards of the technical committee show that in the first 100 miles sixteen stops were made because of tires. In the second century there were fourteen stops for tires; in the third, thirty; in the fourth, sixteen



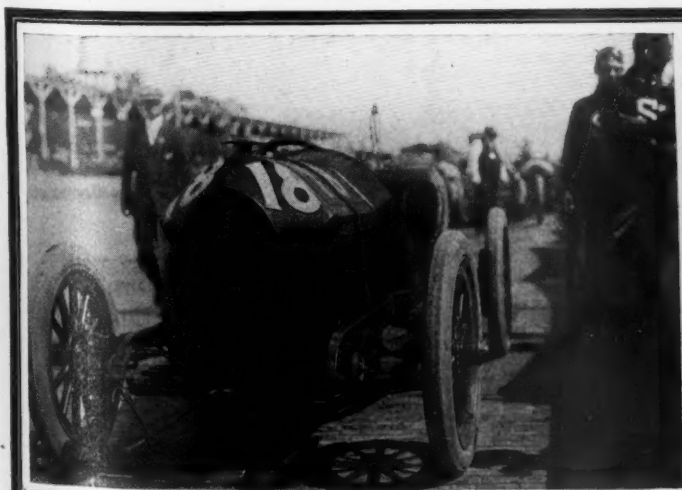
NO. 14 WHITE, AND NO. 15 CUTTING BEFORE START

and in the fifth, fourteen. Ten of the twenty-four cars had been eliminated and in the final 250 miles three more cars dropped out, the Matson, Lozier, the Dingley, Simplex and de Palma.

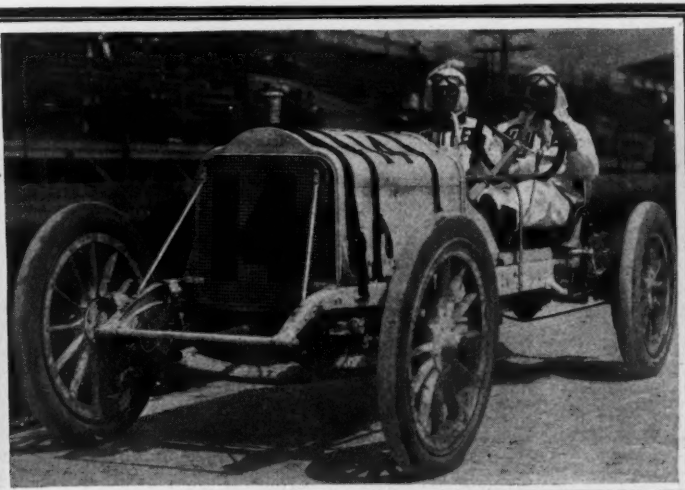
Time of Prize Winners

Reviewing the work of the twelve prize winners from a time stand point it was noted that Dawson's fastest century was the first, in which he averaged 80.7 miles per hour; Tetzlaff did 81.5 in the same

stretch; Hughes's first century also was his fastest, 79.5; Merz did 79.2 in the first hundred; Endicott's fastest was his fourth with 77.5 which rating also was secured by Zengel in his fifth century; Jenkins was 78.6, he did his best work in the first 100 miles; while Horan's best time was 77.4 in the first century; Wilcox did 78.7 in the fourth century; Mulford, 75.6 in his first; de Palma 82.1 in his first and Burman 77.2 in his first. Appended is a table



RED SCHACHT, ONE OF PRIZE WINNERS



JENKINS IN WHITE THAT FINISHED SEVENTH



LINEUP OF THE CARS BEFORE START AND WHILE WAITING FOR PRELIMINARY LAP

Troubles That Made Cars Stop at Pits

showing the century performances of all twelve prize winners.

FIRST—DAWSON, NATIONAL; 78.7 M. P. H.		
Distance	Time	Speed
100 miles.....	74:24	80.7
200 miles.....	74:41	80.3
300 miles.....	79:45	75.2
400 miles.....	75:24	79.4
500 miles.....	76:52	78.5

SECOND—TETZLAFF, FIAT, 76.6 M. P. H.		
Distance	Time	Speed
100 miles.....	73:37	81.5
200 miles.....	74:14	80.8
300 miles.....	91:01	65.7
400 miles.....	80:09	74.8
500 miles.....	72:28	82.6

THIRD—HUGHES, MERCER, 76.3 M. P. H.		
Distance	Time	Speed
100 miles.....	75:16	79.5
200 miles.....	77:32	77.3
300 miles.....	80:36	74.5
400 miles.....	83:13	72.1
500 miles.....	76:32	78.7

FOURTH—MERZ, STUTZ; 76 M. P. H.		
Distance	Time	Speed
100 miles.....	75:41	79.2
200 miles.....	81:12	73.8
300 miles.....	79:29	75.4
400 miles.....	81:52	72.4
500 miles.....	76:26	78.8

FIFTH—ENDICOTT, SCHACHT, 73.3 M. P. H.		
Distance	Time	Speed
100 miles.....	84:38	70.9
200 miles.....	82:50	72.4
300 miles.....	79:51	75.3
400 miles.....	77:10	77.5
500 miles.....	81:59	72.5

SIXTH—ZENDEL, STUTZ, 73 M. P. H.		
Distance	Time	Speed
100 miles.....	85:47	69.9
200 miles.....	84:10	70.7
300 miles.....	77:21	77.4
400 miles.....	83:38	71.9
500 miles.....	77:53	77.5

SEVENTH—JENKINS, WHITE; 72.7 M. P. H.		
Distance	Time	Speed
100 miles.....	76:19	78.6
200 miles.....	84:26	70.8
300 miles.....	81:59	72.5
400 miles.....	84:31	70.8
500 miles.....	85:23	70.1

EIGHTH—HORAN, LOZIER, 71.4 M. P. H.		
Distance	Time	Speed
100 miles.....	77:21	77.4
200 miles.....	80:04	74.8
300 miles.....	87:19	68.7
400 miles.....	89:14	67.2
500 miles.....	91:50	65.2

NINTH—WILCOX, NATIONAL, 69.6 M. P. H.		
Distance	Time	Speed
100 miles.....	108:14	55.4
200 miles.....	83:36	71.9
300 miles.....	82:07	72.0
400 miles.....	76:35	78.7
500 miles.....	80:58	74.3

TENTH—MULFORD, KNOX; 66.2 M. P. H.		
Distance	Time	Speed
100 miles.....	79:14	75.6
200 miles.....	115:47	51.8
300 miles.....	132:05	45.5
400 miles.....	94:50	65.1
500 miles.....	91:04	65.6

Work Done by Drivers and Mechanics During Progress of the Long Race

ELEVENTH—DE PALMA, MERCEDES.		
Distance	Time	Speed
100 miles.....	73:01	82.1
200 miles.....	71:46	83.6
300 miles.....	78:34	79.7
400 miles.....	73:13	81.0

TWELFTH—BURMAN, CUTTING.		
Distance	Time	Speed
100 miles.....	77:45	77.2
200 miles.....	80:42	74.6
300 miles.....	84:12	70.9

It is a fact worthy of note that of the twelve men who divided the \$50,000 purse this year five of them cashed in the 1911 event. Last year Dawson driving a Marmon finished fifth averaging 72.4 miles per hour as against 78.7 miles this year. Hughes who was third yesterday with 76.3 also drove a Mercer last year in which he finished twelfth at an average of 67.62 miles per hour. Merz, fourth this year in the Stutz in 76 flat, drove a National into seventh place last year at an average of 70.37. De Palma drove a Simplex last year at an average speed of 71.13 miles per hour and finished sixth.

Old Father Time received a severe setback as the result of this year's race, and the new table shows most of the marks placed to the credit of de Palma. The old and new records are as follows:

Distance	1911	1912
100	Bruce-Brown	De Palma
200	Bruce-Brown	De Palma
300	Harroun	De Palma
400	Harroun	De Palma
500	Harroun	Dawson

From this it is seen that yesterday's race was 5 minutes faster at 100 miles, 15 minutes at 200, 18 at 300, 27 at 400, and 21 at 500.

THE work done by drivers, mechanics and pit attendants at the long line of repair pits along the inside of the course at the start and finish line invariably constitutes one of the big interest features of a long-distance speedway and road race. In this respect yesterday's race was no exception in that there were many interesting moments at the pits, chief among these being those stops of De Palma and Dawson in the last 100 miles of the race when there was a chance of Dawson gaining his lost miles should De Palma have to make any long stops at the pits for tire changes or motor repairs. From the car entrant's viewpoint the repair pit is not the best advertisement to the car. It is at the pit where repairs are made, tires changed, gasoline replenished, extra oil taken on, water poured into the steaming radiator or any of the scores of other re-



HOW SOME OF THE TIRES LOOKED AFTER CHANGING



ENTRANCE TO TUNNEL UNDER THE SPEEDWAY

pairs made necessary by the gruelling vibration and terrific speed of the race.

Previous to a race there is always much preparation and training of the pit crews. The tire men are trained to the second in making tire changes; those who have to handle the gasoline, oil and water are made expert in the work; and in addition not a few novelties are introduced in each pit to hasten the work, such as special tire jacks, special gasoline funnels and other devices.

What Occurred at the Pits

After the first thrill of excitement occasioned by the start of the great race, peace reigned at the pits. Trouble was not anticipated for at least a short period of time and while the drivers were getting into their stride and picking their positions, pit attendants made a final inspection of their sundry equipment, then settled down to wait the first stop of their respective favorites.

A casual inspection of the various pits from the track, revealed many interesting tool-lay-outs and articles of equipment designed to facilitate replacements, repairs and adjustments. The Simplex car's pit, for instance, was particularly attractive

because of the completeness of its equipment, and the systematic arrangement of its various articles. All tools of a like character were neatly piled together, and so arranged as to have those most often needed in the most accessible positions.

Jacks and tire tools were placed on the wall in front of the pits near the end from which the car approached, so that when the car stopped at the pit, the tire tools were directly opposite the rear wheels, where, of course, the greater number of tire changes were anticipated.

Neatness at Simplex Pit

A generously large vacant place was maintained on the central portion of the wall over which the tires were passed, so that tools and parts at either end were not swept off while passing supplies from pit to car. At the end of the wall opposite the point where the motor would be, when a car stopped at the pits, grease guns, wrenches, spark plugs and such articles as might be required in making replacements and adjustments were arranged.

Tools less often apt to be required, such as hammers, chisels, monkey wrenches, etc., were similarly arranged at the back of the pit, whilst the ready inflated tires on their demountable rims were carefully arranged in the pit. An unusual feature of this pit's equipment was that of a vice mounted on a board placed across one rear corner of the pit, and secured by screw clamps as indicated.

Other pits were to be seen whose equipment was perhaps equally arranged; but still others there were that in marked contrast to the orderliness of their neighbors seemed to have but little knowledge of the value of system. Tools were indiscriminately scattered all over the entire shelves, where they would be swept off time and time again in passing tires. Devices such as jacks and the like failed at the important moment, and special but untried articles of equipment were employed that soon were relegated to the discard when put to the test.

In one of the pits a large filler can for conveying oil, water or gasoline into the supply tanks of a car was employed, which had a body portion with a capacity of

about 10 gallons and a nozzle on it like a sprinkling can. When brought into use during the race it was found that the fluid flowed so slowly through the abnormally small nozzle that its use was quickly ignored. Another entrant had a funnel of unusual capacity which set into the filler opening of the fuel tank so tightly that when a can of fuel was dumped into it an air lock took place which caused the fuel to flow in so slowly as to render it almost useless. On the other hand, many ingenious funnels and filler cans were to be seen.

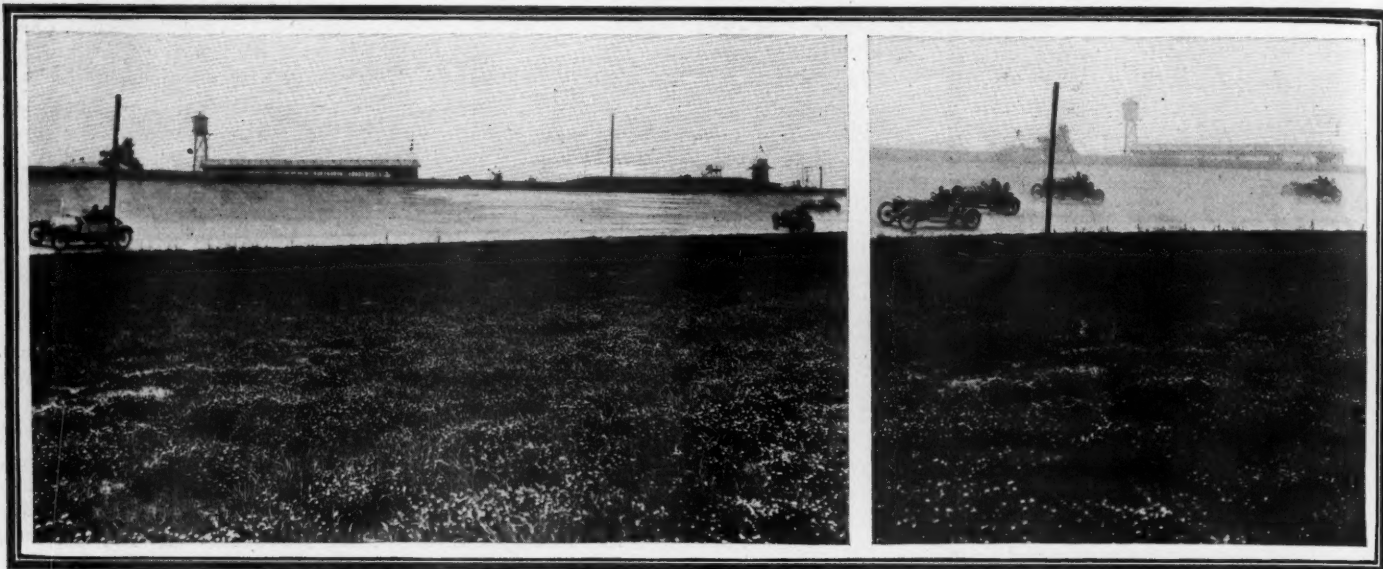
In the Stutz pits special box-like funnels were provided which were built according to Driver Knipper's design. These had turned-in edges to prevent the fuel from splashing out of them when dumped in recklessly, and angle-iron strips were arranged on the bottom at two sides to steady the funnel as it rested on the tank and to furnish an air space for the outlet of air in the tank around the outside of the funnel tube as the fuel flowed through it. The gasoline and oil was kept in large wide-mouthed milk cans, out of which the entire contents could be emptied in but a few seconds. As a result of really good equipment of this kind several minutes were cut off the records.

Fewer Tire Troubles

In spite of the much higher speeds maintained throughout the terrible grind there were fewer tire troubles than last year. This, it is claimed, is due to the use of better tires, to the presence of less oil on the track, the use of Wyandotte, a preparation for absorbing oil, and to the cooler condition of the track. It is claimed that much tire trouble was eliminated this year by treating the treads of the tires to a buffing process which consisted in grinding away much of the tread with a rough emery wheel in order to reduce its thickness and thereby facilitate the radiation of heat from the tire. Last year, as a result of the heavier treads employed, the treads came off in strips, exposing the bare fabric and requiring a change. This year there were comparatively few examples of tread strips coming loose and as a result the tires wore until the treads of the fabric gave way and a blowout occurred.



RACE OFFICIALS. IN ORDER NAMED: CARL FISHER, PRESIDENT OF SPEEDWAY; CHAIRMAN SCHIMPF OF A. A. A. CONTEST BOARD; CHAIRMAN EDWARDS OF TECHNICAL COMMITTEE; REFEREE PARDINGTON AND A. A. A. REPRESENTATIVE SEDWICK



TWO SCENES SHOWING CARS ROUNDING LOWER TURN

Of the twenty-four cars entered, twenty were equipped with Michelin tires, two with Palmer-Cord tires of English make, one had Miller tires, made in California, and the other was equipped with Firestone tires. First and third place in the race were won by cars equipped with Michelin tires; Tetzlaff's Fiat, which was second, bore the Miller's, and the Firestones were used by Burman.

On the whole more speed was exhibited in changing tires this year than in previous years. The time for a car to stop, change a tire or two and to get away again generally averaging about a minute, though many changes were made in less time. De Palma in his 88th lap is credited with a change of a right front tire in 30 seconds, and Wishart has a similar record made in his 52nd lap. Four of the cars in the race were equipped with wire wheels, three of which were of the imported Rudge-Whitworth design, and the fourth, McCue wheels of domestic make.

Use of Wire Wheels

Those having the Rudge-Whitworth wheels were the two Case entries and the Mercer, whilst the McCue wheels were fitted to the Firestone-Columbus. In changing tires with these wheels, practically the entire wheel was removed and replaced by another. The wheels are detached at the hub, which is of double construction. The inner portion of the hub, which contains the wheel bearings, remains permanently attached to the axle of the car, whilst the outer hub is removable with the rim and spokes of the wheel. A single nut with a locking mechanism serves to secure the outer hub of the wheel to the inner one. As for the time required in changing a wire wheel for the purpose of fitting a new tire, the changes are made with practically the same speed as that made by most of the pit men in replacing the demountable rims on ordinary wheels; and it is reasonable to believe that when the workmen become more accustomed to making replacements

they will be on a par with the ordinary type of wheel.

Owing to the fact that only one of the cars equipped with wire wheels, the Mercer, managed to finish the race, hardly sufficient data was obtainable to show whether or not increased tire mileage was obtainable by their use. The Mercer car made seven changes. These, however, are claimed to be due largely to the tires not being sufficiently large.

Most of the tire changes were made on the right rear and right front tires. This was due to the fact that as the cars encircle the track in anti-clockwise direction the tires on the right side of the car were the outer ones, and in negotiating the curves the outer tires were subject to the greatest strains. When skidding on curves the outer tires also would tend to slide onto the outer and rougher portion of the track which also would have a tendency to assist in wearing them out. Most of the drivers slacked down considerably in negotiating the turns, which shows that the drivers had made quite a study of the track from the standpoint of tire wear.

In observing the course taken by several of the leaders, it was noticed that De Palma, Dawson and Tetzlaff drove nearer the outer edge.

Seven stops were made by the National car, driven by Dawson, for the replacement of tires, four of these were right rear tires, two of them right front tires, one left rear tire, and the left front tire remained unchanged from start to finish. These stops were made in the 78th, the 107th, the 142nd and the 175th lap, and one stop was made in the 181st lap to change a spark plug. The total time lost at the pits was 14 minutes and 12 of these were consumed in changing tires. Gasoline, oil and water, however, were taken on at the same time.

De Palma's Tire Changes

De Palma made but three tire changes throughout the 198 laps. One of these was the right rear tire and two of them the right front tires; 2½ minutes were consumed to make these changes. Two other stops were made, however, one of 30 seconds to adjust the carbureter, and another of 1 minute to take on gasoline. His total time lost at the pits was 4 minutes. De



VIEW OF PITS AND STRETCH FROM THE PRESS STAND



FIELD ENTERING FIRST TURN JUST AFTER RACE STARTED

Palma's stops for tires were made in the 88th, the 112th and the 179th laps, and in all he consumed 10 minutes less time at the pits than Dawson. Tetzlaff and his Fiat made four tire stops, which cost him 10 minutes' time. These were made in the 104th, 114th, 141st and 182nd laps. In the 158th lap a 5-minute stop was made for gasoline and oil, and another stop in the 113th lap was made on account of motor trouble; 16 minutes in all were lost at the pits.

Hughes' Troubles

Hughes' Mercer lost 9 minutes during the seven tire changes made, four of these changes were compulsory because of blowouts and the other three changes were made in order to prevent blowouts. Hughes' greatest delay occurred in the 96th lap, when he ran out of gasoline about $\frac{3}{4}$ mile from the tape, necessitating that he and his mechanic push the car the entire length of the home stretch in order to bring it to the pits for more.

Many of the renowned drivers in this race were eliminated before the contest was half over. Of these Bruce-Brown in

his National was one of the first to quit, his car being withdrawn at the end of the 75th lap after several vain attempts had been made to put it into condition. At first it was thought the trouble was due to leaky valves and several were removed, but a broken piston ring was the real cause of the trouble. It caused the motor to misfire in one cylinder so badly that it was impracticable to continue.

Eddie Hearne in the Case car No. 6 was the next driver of repute to be deprived of his mount. Although not driving it at the time, it was withdrawn in the 55th lap on account of a broken camshaft bearing.

Disbrow, who had been driving the other Case entry, turned his car over to Whalen in the 57th lap, with instructions to handle it with care as its rear axle had begun to show signs of weakness, and in the 64th lap a broken axle shaft or differential mechanism put out the second Case entry.

Wishart's Mercedes, which in practice had proven to be one of the fastest cars of the fleet, retired at the end of the 92nd lap with a broken water connection.

Lubrication troubles are believed to be

the cause of the defeat of several of the cars. To lack of lubrication is attributed the broken connecting-rod which put Ormsby's Opel out of the race in the sixth lap, Knight's Lexington in the seventh lap, Matson's Lozier in the 110th lap, Dingley's Simplex in the 116th lap, and de Palma's Mercedes in the 198th lap.

Several cases of broken valve stems presented themselves. Wilcox's National drew up to the pits at the end of the twelfth lap for 9 minutes, during which time a cylinder plug was removed and an exhaust valve changed. Dingley also stopped for 8 minutes in his nineteenth lap to remove and replace an inlet valve, whose stem was broken off opposite the hole in which the spring-retainer rests.

Several spark plug changes were made, one on Dawson's National, two on Wilcox's National, one on Rickenbach's Firestone, two on Dingley's Simplex, and one on Hearne's Case.

The Winning Car

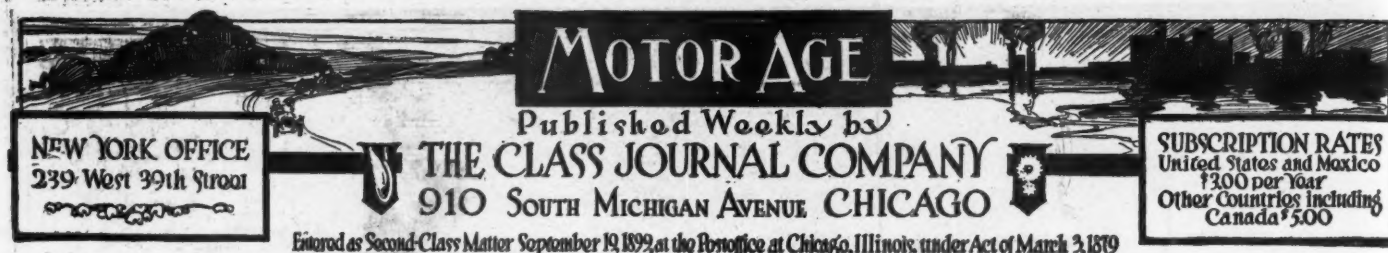
Dawson's National was a special car using a four cylinder T-head motor of 5-inch bore by $6\frac{1}{4}$ inch stroke and with the cylinders cast in pairs. The wheelbase was shorter than that of the other two Nationals. Dawson used a Schebler carbureter, two-spark Splitdorf magneto, Michelin tires, and a double set of Hartford shock absorbers both front and rear.

The tabulation gives the weights of the different cars that competed:

	Pounds.
No. 1 Stutz	2,445
No. 2 Stutz	2,415
No. 3 Flat	2,755
No. 4 Mercedes	2,637
No. 5 Case	3,345
No. 6 Case	3,759
No. 7 Mercedes	2,705
No. 8 National	2,615
No. 9 National	2,845
No. 10 Lexington	2,505
No. 12 Simplex	3,321
No. 14 White	3,297
No. 15 Cutting	3,189
No. 16 Firestone-Columbus	2,304
No. 17 Buick	2,405
No. 18 Schacht	2,405
No. 19 Knox	3,525
No. 21 Mercer	2,315
No. 22 Lozier	3,449
No. 23 McFarlane	2,875
No. 24 Opel	2,469
No. 25 Lozier	3,535



LINING UP FOR START OF RACE



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MOTOR AGE

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Getting Speed from Small Motors

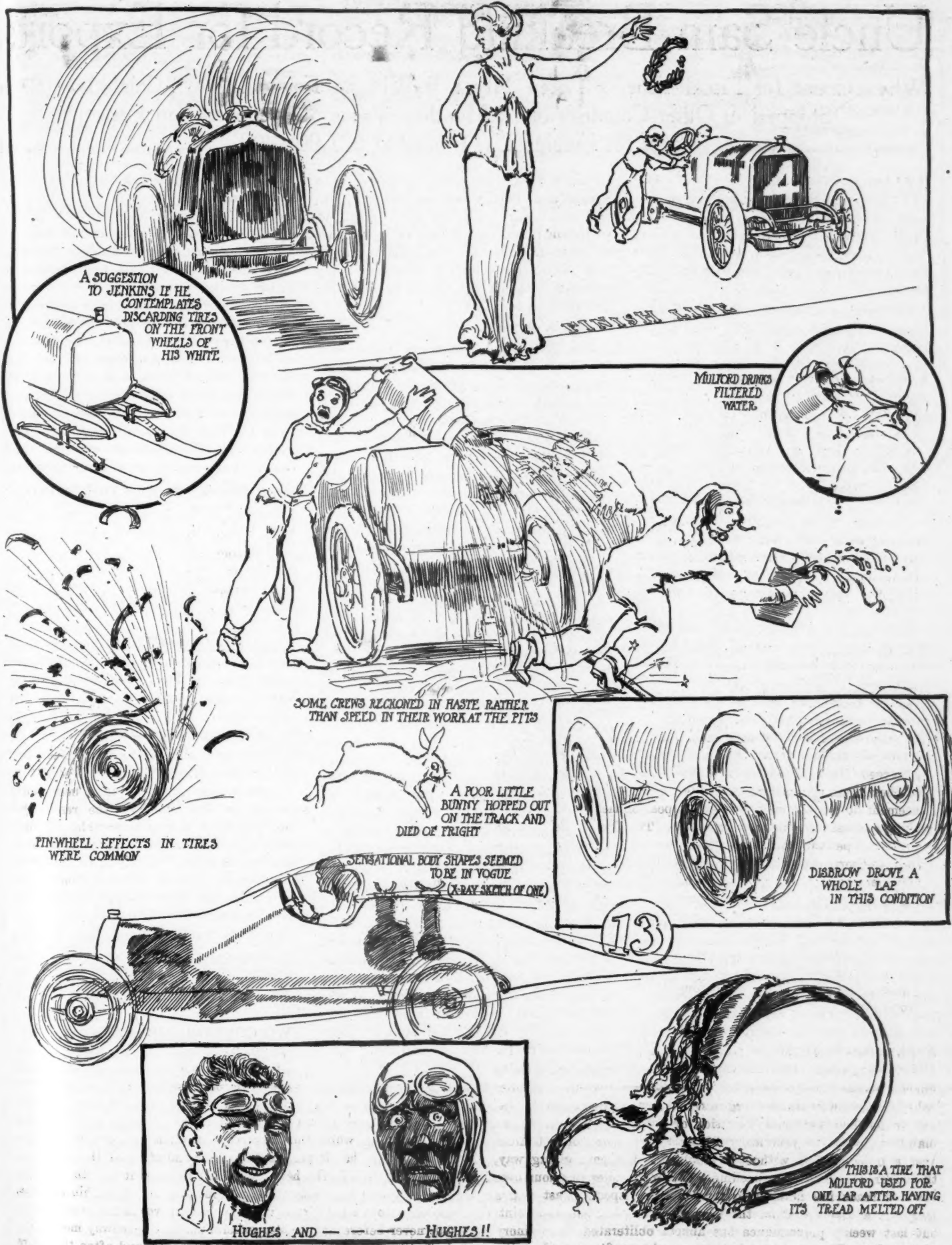
THE most conspicuous feature of last week's 500-mile free-for-all piston displacement race on the Indianapolis speedway was the enormous speeds that it is possible to get out of relatively small motors. Each year sees the motor of 300-cubic inches piston displacement made miles per hour faster, so that now it can be made to maintain nearly as high speeds as the 600-cubic-inch motor. The possibility of increasing speed from small motors lies in increasing the crankshaft speed, so that today crankshaft speeds in some cars average as high as 2,000 revolutions per minute from start to finish of the race, whereas a few years ago speeds of 1,500 revolutions per minute for such a period would be considered very high. The high speeds of today have been obtained by lowering the weight of the pistons and connecting rods. One motor in the speedway races used pistons and connecting rods that weighed but 5 pounds for each cylinder, as compared with 14 or 15 pounds in many stock motors of the same size. Such a reduction of weight has been possible by the use of forged steel pistons or cast steel ones in some motors. The forged steel piston is today in its infancy, but there is not any reason why car specifications in 5 years will not include forged pistons just as today they include forged steering parts, motor shafts, etc.

THE days of bulk and mass are fast passing: To get more speed it is not any longer necessary to increase the piston displacement. Reduce weight and you get the desired speed. Road and track races have done a great deal for the development of motor cars up to the present and their work is far from done. Last week's race demonstrated this. The race showed the efficacy of reduced weight of reciprocating parts. The Mercer car with its forged steel pistons and hollow connecting rods was the smoothest running machine on the track, and for its piston displacement it showed enormous speed possibilities. The work of making pistons for this was expensive. The first trials were not successful; perhaps more than a dozen or a score were needed before the correct result was obtained. But all pioneering is slow and expensive and this could not be any exception to the rule. Forging the piston is but a small part of the work, the machining is a difficult problem, the grinding offers its obstacles and when these are done the question of clearance presents itself. The work of the steel piston demonstrated its feasibility, there will be more of them in the next big race and it will not be long before the big general public will be demanding the use of forged pistons in stock cars.

MANUFACTURERS of the cars in the race are to be congratulated on the excellent showing of safety in steering knuckle parts. Last week's was the first big speedway meet ever held in America in which there were not broken steering knuckles, due to the long-continued vibration of the race. When cars can maintain speeds of practically 80 miles per hour for 500 miles over a brick surface without a single steering part giving way, the buyer who drives his machine at 35 or 45 miles per hour over variable roads has nothing to fear in this respect. Last year's race was a disgrace from the broken steering-knuckle viewpoint, but last week's performance has almost obliterated the memory of that day. The car buyer is the man who profits, providing the car maker is putting as good materials into his stock cars as in the racing machines, in these parts.

THE most glaring defect in American and foreign cars, as demonstrated in the contest, was the inadequacy of several lubrication systems. It is only safe to assume that wherever a connecting rod bearing burned out or gave way it was directly due to lubrication. There were at least four cases of this. In each instance the explanation seems to lie in the stoppage of oil pipes leading to the lower or upper connecting rod bearings. In some, in fact in nearly all, of the races these pipes are of small diameter and it requires but a small foreign particle to stop the oil flow and work the ruin of the motor. This condition points to the more general use of forced feed with high pressure to all of the important motor bearings. This problem is concerning American manufacturers, but it is also being wrestled with by the French, German, English and Italian manufacturers. All of them are learning the inefficiencies of the varied forms of splash systems. All of them are also realizing the necessity of regulating the oil flow with the motor speed and motor work. What the eventual outcome of the lubrication question will be is not quite clear at present, but it is a certainty that the car of the future will have oil forced under pump pressure to all of the crankshaft and connecting rod bearings, with the possible elimination of splash in the crankcase. The big problem with motor lubrication is to get enough into the bearings and not too much into the cylinders. Too much oil has worked nearly as many, if not more, troubles than too small a quantity. In cylinder lubrication the problem is enough and only enough at the right time. The throw-off from the lower connecting rods bearings and from the wrist pin bearings has proven adequate as splash for several cars for a number of years. With some of these it has been necessary to use the oil baffle plate in the lower end of the cylinder in order that too much oil does not get into the cylinder; and while some have been doing this with excellent results others have been doing everything to fill the cylinders with oil, with the result that smoking is general, there is much spark plug trouble, cylinders are soon coated with carbon, the cooling system is affected, ignition knocks develop and a host of troubles ensues. Look to getting the right quantity in the right place and at the right time. That is the problem.

THE tire nightmare has faded a little into the background during the last year, but still there were over ninety changes made on the twenty-four cars in the 7,700 miles which was the grand total distance traveled by all of the cars in the race. This gives an average tire life in the race of 85 miles. The tire story of last week was an entirely different one from a year ago. In the 1911 race the tread strips on the tires came off, when otherwise the tire did not show any wear. This year there was scarcely an example of tread strips coming loose, due to the buffing or grinding away of much of the surplus rubber on the tread. In some cases the buffing was carried on until the fabric was almost exposed, and while this seemed to weaken the tire it operated otherwise in that it permitted a rapid radiation of the heat from the tire. Getting the heat out of a tire saves it. With the thick rubber treads the heat cannot get out and the air within expands, causing blowouts. Tire buffing has been in vogue for over 2 years, but never before was it in so general use in a speedway meet. The buffed tire wore until the fabric was exposed, and often the entire fabric was a mass of shreds after a blowout and when the car pulled up at the repair pits.



An Artist's Impression of Indianapolis 500-Mile Race

Uncle Sam Breaking Record for Exports

When Count for Fiscal Year Is Taken July 1 It Will be Found 20,000 Cars Have Been Shipped to Other Countries in 12 Months—Value of Machines and Parts Sent for Foreign Use Placed at \$27,000,000

WASHINGTON, D. C., June 3—Twenty thousand motor cars will be the export record of the United States in the fiscal year which ends with the present month, and their value, including parts and accessories, will approximate \$27,000,000.

The detailed shipments for April and the 10 months ended April, 1912, were as follows:

—April—		
Exported to—	No.	Value.
United Kingdom	579	\$ 463,560
France	104	66,683
Germany	64	46,735
Italy	21	16,181
Other Europe	169	132,093
Canada	809	1,004,638
Mexico	16	22,291
West Indies and Bermuda	43	34,415
South America	131	167,911
British Oceania	134	137,124
Asia and other Oceania	140	160,215
Other countries	28	28,353

10 months		
Exported to—	No.	Value
United Kingdom	4,716	\$3,765,765
France	444	370,836
Germany	212	153,721
Italy	139	122,247
Other Europe	858	715,186
Canada	4,424	5,181,232
Mexico	258	394,759
West Indies and Bermuda	270	282,381
South America	1,282	1,553,629
British Oceania	3,034	2,725,047
Asia and other Oceania	849	889,368
Other countries	321	315,976

The imports of cars for the same periods were:

—April—		
Imported from—	No.	Value
United Kingdom	10	23,817
France	34	74,489
Germany	8	20,075
Italy	3	7,579
Other countries	4	7,896

10 Months		
Imported from—	No.	Value
United Kingdom	170	389,182
France	339	818,564
Germany	108	240,393
Italy	115	171,706
Other countries	113	247,650

Figures Only Estimated

The statement made above is necessarily in very round terms, for the bureau of statistics, upon whose figures the estimate is based, has at present detailed figures covering but 10 months. They show, however, nearly 17,000 cars exported to foreign countries in the 10 months ending with April, valued at \$16,470,147; parts thereof, \$3,296,348; tires, separately from cars, \$2,063,603, and motor engines two-thirds of a million dollars, making a total for the 10 months of practically \$22,000,000, and fully justifying the assertion that for the full 12 months the total will approximate and probably exceed \$27,000,000. This figure includes only the exports to foreign countries and is exclusive of the 900 cars sent to our noncontiguous territories, valued at about \$1,500,000.

This total of \$27,000,000 worth of motor cars sent out of the country in 1912 is

in marked contrast with the figures of a decade ago, 1902, which, by the way, was the first year in which the bureau of statistics found the exports of motor cars of sufficient importance to justify a separate record, the total for that year being a little less than \$1,000,000, as against \$27,000,000 10 years later.

Growth of Exports

The growth in exports of motor cars from the United States has been especially marked during the period since 1905, this growth being coincident with the expansion of the domestic industry and a corresponding decrease in imports of cars. Thus in the period from 1899 to 1904 the value of domestic manufactures of this class of articles increased about \$25,000,000, from \$5,000,000 in 1899 to \$30,000,000 in 1904, while in the period from 1904 to 1909 the value of the output increased practically \$220,000,000, from \$30,000,000 in 1904 to \$249,000,000 in 1909. Accompanying this notable growth of production the imports of cars decreased from \$4,500,000 in 1906 to \$4,750,000 in 1907 to approximately \$2,500,000 in 1912.

While France still leads the world in exports of motor cars, the United States surpasses that and all other countries in rapidity of growth of production and exportation. For example, our own exports of that class of articles have increased from \$5,000,000 in the calendar year 1908 to nearly \$20,000,000 in 1911, while in the same period those of France increased from \$24,600,000 to \$31,700,000; those of the United Kingdom from \$7,600,000 to \$15,500,000; those of Germany from \$3,000,000 to \$11,000,000, and those of Italy from \$5,500,000 to \$6,100,000. Thus in the brief 3-year period from 1908 to 1911 there was an absolute gain of about \$15,000,000, or 300 per cent in exports from the United States; of \$7,900,000, or over 100 per cent in those from the United Kingdom; of \$8,000,000, or 266 per cent in those from Germany, and of \$600,000, or slightly more than 10 per cent in those from Italy.

Where Cars Go

Approximately 25 per cent of the motor cars exported from the United States is shipped to Canada; about 40 per cent to Europe, chiefly Great Britain; about 20 per cent to British Australia, about 8 per cent to South America, and smaller proportions to Mexico, the West Indies, and various countries in Asia, Oceania and Africa. Of the motor cars imported into the United States France supplies about one-half.

The fall in export price of motor cars is an especially striking feature of the

bureau of statistics' figures. They show an average valuation for all motor cars exported in 1909 of \$1,800 each and in 1912 of \$980, the average export price in 1912 being thus but a little more than one-half that of 1909. This remarkable fall in the average valuation of the motor cars exported is due in part to a general reduction in the selling price of motor cars during the period in question, a disposition on the part of manufacturers to reduce the price of the machines to meet popular demand, but more especially to the fact that large numbers of partially used or second-hand cars are in recent years being exported to Canada, Mexico and the West Indies, thus reducing the average valuation.

FORD BREAKS PRODUCTION RECORD

Detroit, Mich., June 3—During May the Ford Motor Co. broke all records for numerical construction of motor cars by completing and shipping no fewer than 9,824 cars of the model T type. Production along similar lines has been laid out for June.

Coincident with this announcement comes an apparently well authenticated rumor that the Ford company intends to make a cut in the price of its car, in the near future. This is firmly believed by the other Detroit manufacturers. The impending move does not, however, create more than a ripple on trade conditions.

Considerable more attention is being paid to the report that the Dodge Brothers Co., which for a long time built the Ford motors, would market a car in 1913, to be retailed from Ford agencies. This car is understood to be a six-cylinder affair at a moderate price, though considerably more expensive than the Ford.

That the Dodges contemplate entering the manufacturing field is generally admitted. Their long business association with the Ford interests lends strength to this rumor.

TWO CONTROL AMPLEX COMPANY

South Bend, Ind., June 1—H. N. Hovey and T. C. Starret, of Detroit, chief stockholders of the Simplex Motor Car Co., of Mishawaka, manufacturer of the Amplex, have acquired all the stock in the concern, the thirty or more small stockholders turning in their stock rather than stand a pro rata assessment. This action will, it is believed, save the concern for Mishawaka. It is said that the men from Detroit are now out about \$500,000, but are willing to invest more and put the concern on a larger manufacturing basis and will not move the plant to Detroit as

has been reported. The affairs of the company have been amicably adjusted. The concern is not defunct, and will not shut down, but will continue operations on a small scale until reorganization.

From what can be learned capitalists will be seen in the next few weeks and will become interested in the Amplex company and with Mr. Hovey and Mr. Starret will completely reorganize the concern and it may be capitalized at \$1,000,000.

GRAMM DIRECTORATE CHOSEN

Toledo, O., May 30—At a meeting of the directors of the Gramm Motor Truck Co. at Lima, O., on Thursday, May 23, the final reorganization of its directorate was completed. B. A. Gramm having resigned the vice-presidency, G. W. Bennett, vice-president of the Willys-Overland Co., was elected in his stead, the full list of officers being, John N. Willys, president and general manager; G. W. Bennett, vice-president; James E. Kepperley, secretary; Walter Stewart, treasurer, and Harvey L. Hooke, assistant general and factory manager.

The factory force has been systematized and the production of the factory is already almost double what it was when Mr. Willys purchased control. Plans for 1913 are constructive and extensive, and Mr. Willys fully expects to make not fewer than 2,000 trucks in the next fiscal year.

The product is being refined by the advent of Carl A. Neracher, the Willys-Overland Co.'s consulting engineer. The sales will be made through the commercial car department of the Willys-Overland Co. of Toledo, from which point the sales policy will be directed.

B. A. Gramm, founder of the company, is organizing another concern which will build trucks after the Gramm idea.

LAMP DECREE MODIFIED

New York, June 3—The decree entered by the United States circuit court in the suit charging unfair competition which was brought by Samuel W. Rushmore against the Badger Brass Mfg. Co. of New York has been modified on appeal of the Badger company to the United States circuit court of appeals. The suit was brought on account of an alleged initiation of the Rushmore lamps by the defendant company, which, it was charged resulted in confusion to the trade. The court below held that the defendant was guilty and adjudged an accounting and an injunction.

In the opinion of the United States circuit court of appeals the decree of the circuit court extended too far and the order of court provides for relaxing the accounting so that it shall include only such transactions in which it can be shown by direct or presumptive evidence that actual damages have been sustained in that the complainant would have sold the lamps but for the sale by the defendant. The court lays down a rule that a decree for profits and damages does not necessarily follow a decree for an injunction.

The court affirms the decree in other particulars, allowing the injunction to stand. The Badger company showed that it had abandoned the manufacture of the specific type of lamp that was involved in the suit.

DAME RUMOR BUSY

New York, June 4—Old Dame Rumor is busy this week, but there is not much credence placed in her stories. One of them is to the effect that there is to be a merger of the Studebaker Corporation and the United States Motor Co., which is denied by officials of both concerns. Another hints at a combination of Metzger, Marmon and Overland, also denied. A third is that the Ford company may buy the Lozier, Metzger and Universal truck, probably based on the fact that Mr. Ford recently inspected the Lozier plant and bought a Lozier car. Even more incredible is the gossip that there is to be an amalgamation of all the truck companies of Cleveland and Buffalo with the Metzger company.

Still another merger rumor makes a huge combine consisting of Ford, Lozier, Overland, Marion, Henderson, Garford and Gramm. This is based upon the recent inspection of the Lozier plant by the Ford party, and to the fact that representative officers of several of the companies were together at the Indianapolis race and at Detroit.

OWEN COMPANY SUES REO

Detroit, Mich., June 4—Suit for \$330,000 has been brought in Judge Hosmer's court here by the Owen Motor Car Co. against the Reo company of Lansing. The suit grew out of the purchase of the former concern by the latter some time ago.

At the time of the purchase the Owen company maintained a factory in Detroit which manufactured a high-powered car known as the Owen. The purchase price was \$100,000, paid in stock of the Reo company. According to the bill of complaint the Reo promised to continue the manufacture of the Owen car at Lansing and to pay over all profits from Owen sales, less 10 per cent, to the Owen company.

The complaint states that the Reo company has abandoned the manufacture of the Owen car and that no profits are forthcoming.

The Reo company in its answer asserts that the cars were unsalable and that it was unable to get rid of more than thirty, despite an advertising expense of \$30,000.

COLT'S PLANS APPROVED

New York, June 3—Stockholders of the United States Rubber Co. have informally approved the plan suggested by President Samuel P. Colt to increase the capitalization of the company from \$75,000,000 to \$120,000,000 and including the retirement of \$10,000,000 of the second preferred; the issue of a like amount of first preferred and a common stock dividend of \$5,000,000. The expected opposition did not develop much strength and the action of the

stockholders will be presented to a special meeting which will be called in the near future for ratification. President Colt said that only \$10,000,000 of additional capital was needed at present and that the increase of the stock issues by \$45,000,000 was only to provide for future development and contingencies.

ENGINEERING STAFF ORGANIZED

Toledo, O., June 3—Carl A. Neracher, who for several years has been chief engineer of the Garford Co., Elyria, Ohio, has been appointed by John N. Willys, president of the Willys-Overland Co., consulting engineer of that concern and of all the Overland and other Willys properties. Mr. Neracher will make his headquarters at the Toledo factory, where the various engineering departments will be centered, leaving only a working force of subordinate engineers at the factories proper. Fred I. Tone, the designer of the American and the Marion, is chief engineer of the Overland plant at Toledo and will remain its resident engineer, while F. Byszantz will remain the resident engineer of the Gramm Motor Truck Co.

CHANGES AMONG STUTZ OFFICERS

Indianapolis, Ind., June 4—In a reorganization of the Ideal Motor Car Co., maker of the Stutz, E. G. Sourbier retires as treasurer, selling his stock to H. F. Campbell, president of the Stutz Auto Parts Co., already a principal stockholder in the Ideal company and president of the board of directors. Campbell retires as president of the Ideal to become treasurer. Harry Stutz, factory manager and designer, was elected president and director. J. H. Ebersole, of Washington, D. C., secretary, will come here to take an active part in the company's affairs.

Carl G. Fisher is organizing a company to take the Stutz and Packard agencies in Indiana, and Frank L. Moore, until recently with the Archey-Atkins Co., will be associated with him.

CONDITION OF RUBBER MARKET

New York, June 3—Labor troubles on the Amazon is the reason given for the decrease in the supply of crude rubber at primary markets this week, but despite that condition the price levels sagged another notch in response to the small demand and quiet trade. The total supply of the plantation grades to be auctioned at London this week is estimated at 400 tons, which is about 250 tons less than the recent average. The American receipts of crude over Sunday amounted to 5,400 cases and packages—considerably above the usual amount. The current price level of up-river fine is \$1.08½ a pound, with the other grades in proportion.

MORE CLUBS JOIN A. A. A.

New York, June 5—At the regular semi-annual meeting of the national assembly of the A. A. A., held yesterday at the Hotel Astor, forty-three clubs were added to the membership roll.

Milwaukeeans Pick Road Race Dates

MILWAUKEE, WIS., June 5.—The ninth race for the Vanderbilt cup will be run at Milwaukee, Wis., on Tuesday, September 17, and the fourth renewal of the international classic, the race for the Automobile Club of America's gold cup, the grand prix, will be decided over the same course on Saturday, September 21. The first contest for the Pabst Blue Ribbon trophy, a \$10,000 gold cup donated by Colonel Gustave Pabst, will be run co-incidentally with the Vanderbilt, and the initial race for the Wisconsin Motor trophy, a \$2,500 cup donated by the Wisconsin Motor Mfg. Co. of Milwaukee, will be run in connection with the grand prix.

The dates were decided upon following a conference between representatives of the Milwaukee Automobile Dealers' Association and William Schimpf, chairman of the contest board of the A. A. A. at Indianapolis on Memorial day. The course selected by the M. A. D. A. also was approved, subject to further viewing by the A. A. A. representatives and approval by the A. C. A. The official entry blank, formal applications for sanctions for the four contests on the dates named, and other information were forwarded to the A. A. A. and A. C. A. early this week by Race Secretary Bart J. Ruddle, and it is expected that by the end of the week the lists will be open and the actual preparations for the greatest speed carnival that has ever been held in the west will be officially under way.

The Greenfield course, which has been selected for the running of the classics, will when reconstructed, measure 8.7412 miles, according to the official survey made yesterday by William Hughes, official surveyor. The roads comprising the course at present measures about 9.9 miles, but by cutting away sharp turns and otherwise improving the course, the distance around the circuit in the center of the highway will be exactly 8.7412 miles.

The Vanderbilt will thus be either thirty-three or thirty-five circuits of the course, 288.2 or 304.6 miles; the grand prix, forty-five or forty-seven circuits, 393.75 or 410 miles. It has been decided to make the Pabst Blue Ribbon contest 225 miles and the Wisconsin Motor Trophy 175 miles, or as nearly this figure as the distance of the course will make out.

The official survey calls for reconstruction of the big turn at the south end of the diamond-shaped course so that it will have a radius of 1,500 feet. At present the turn consists of a steep decline from the Mill road into Janesville Plank road. A large orchard will be used for the turn, which will be well banked to permit of high speed to get into the Janesville plank straightaway of more than 2 miles in length.

The right-angled turn from Hawley road

Vanderbilt Cup Will be Run September 17, at Same Time as Pabst Trophy Event—Grand Prix and Wisconsin Motor Contests for 21st—Circuit 8.7 Miles Long

into Lincoln avenue, the south limits of the city of West Allis, along which the course runs for better than ½ mile, will also be cut away and a banked turn of good radius built. The common council of West Allis has already started work on this part of the course. Contracts for the remainder will be let by the M. A. D. A. before the end of the week. The awards will be made on conditions of heavy guarantees so that it will be certain that the work will be completed in plenty of time. Only 14 weeks remain before the big cars begin hurtling around the course in preliminary practice and it is realized that haste is imperative.

HARDING WINS FLETCHER CUP

Philadelphia, Pa., June 1—Favored by weather and road conditions bordering on the ideal, eleven contestants motored over a course of approximately 65 miles through Philadelphia and suburban towns today in the ninth annual contest of the Automobile Club of Philadelphia for the Fletcher cup. W. S. Harding, driving a Cadillac, captured a leg on the trophy by finishing with a penalization of 12¾ points as against 14½ points for E. C. B. Fletcher, driving a Packard, who was second, and 15 points scored against Charles Moller, Stearns-Knight, third.

The closeness of the contest can be gleaned from the fact that a margin of only 2¼ points separated the first three places. Alan Corson, who captured a leg last year, was fourth with a penalization of 20¾ points. The route lay over unfrequented roads through Main Line towns, through Valley Forge, returning by way of Malvern, Sugartown, White Horse, Bryn

Mawr and Cynwyd. A stop was made for luncheon at the King of Prussia inn.

The Fletcher cup contest is a continuation of the Brazier cross-country challenge cup run, originated by H. Bartol Brazier in 1903. G. B. Fletcher won the cup in 1905, 1908 and 1909, which gave him permanent possession of the Brazier trophy and he then offered another cup to be similarly competed for.

During the first 4 years of the event it was a speed and endurance race, but since 1906 it has been a legal speed limit run, conforming to the local speed regulations of the various sections traversed. Instead of an endurance test of the car, the run is now more of a test of the ingenuity and skill of the drivers.

Today's contestants and the order in which they finished:

Name	Car	Penalization
W. S. Harding	Cadillac	12¾
E. C. B. Fletcher	Packard	14½
Charles Moller	Stearns-Knight	15
Alan Corson	Buick	20¾
G. W. D. Fletcher	Buick	25½
P. M. Elsasser	Lozier	26
A. J. King	Columbia-Knight	32½
Henry Fallow	Case	38½
D. Walter Harper	Case	92
F. M. Mitchell	Marmon	153

W. D. McCullough, driving a Stutz, was disqualified for leaving the course.

SALEM MEET POSTPONED

Boston, Mass., June 1—Heavy rain caused a postponement of the motor races scheduled for May 30 at Rockingham park, Salem, N. H., May 30 and now they will be run off on June 8. A telegram was sent to Joe Dawson asking him to name a price to come east and race Harry Grant or enter the special 20-mile race, which will be the feature. It also is hoped to get New York talent.



PUTTING FRENCH GRAND PRIX COURSE IN SHAPE

French Make Ready for Their Grand Prix

Distance to be 956 Miles in 2 Days Over Circuit 47.8 Miles
Around—Roads Being Prepared with Calcium Chloride
for Top Dressing—Grand Stands Being Constructed

PARIS, May 21—With 956 miles to be covered, the grand prix race of the Automobile Club of France will be the longest pure speed test over ordinary roads ever held in Europe. The race, which is run on Tuesday and Wednesday, June 25 and 26, will comprise each day ten rounds of a course measuring exactly 47.8 miles, thus giving 478 miles for each day, or a total of 956.

The start will be given, in all probability, at 4:30 a. m. on the first day at the grandstands erected about 800 yards from the Dieppe end of the triangular course. The cars will be sent away at intervals of 30 seconds, and as there are fifty-eight entries, and the record for a round is 36:31, it is evident that an interval of about 7 minutes will elapse between the starting of the last and the arrival of the first car.

Course an Old One

The course selected is the one used for the 1907 and the 1908 grand prix races, on which in 1907 Nazzaro set up a record of 70½ miles average for a distance of 478 miles, this being the high-water mark for European long-distance road racing. The retention of the old course will allow of interesting comparisons between the two former races and that of the present year.

It is admitted that the Dieppe course is one of the fastest that could be found in France. It is triangular in shape, each of the three sides measuring about 16 miles. For convenience the grandstands and tire stations have been erected at a point 800 yards from the Dieppe end of the triangle, from which position it will be possible to look across the angle and see the cars approaching the fork on the sea-

shore leg of the course. Although the road is straight in front of the stands, it is not at this point that the highest speeds will be attained, for the ground is slightly rising, and the cars will hardly have got into their full swing after rounding the bend. With the exception of a double bend on a down grade, this first leg of the course is practically straight as far as Londinières. Here there is a right-angle turn, the course cutting over the car lines, making a double S turn, then climbing a hill with easy bends. The top of the hill reached, the course is of a switchback nature for a short distance, then dead straight for 5 or 6 miles, allowing unlimited speed.

There is a fine down grade with a couple of easy bends on it, then a couple of twists, one of them being under a railway bridge, into the town of Eu. This is one of the most difficult corners on the course, for the cars have to run right into the town, twist round on the market place, and as soon as they are round the bend climb a fairly steep hill out of the town. Fortunately the market place is very big, and with stout boarding there will be no danger to spectators.

Third Leg a Straightaway

The third, or coast leg of the course, is at first straight; it has several bends through the village of Criel, and is then practically a perfect straightaway, parallel with the sea, right down to the Dieppe fork, the last portion being slightly on the down grade. It was on the last portion of the course, undoubtedly the fastest of the lot, that Albert Clement met his death in 1907, through taking what appeared to be a very easy turn at too high a

speed. To get round the Dieppe fork it will be necessary to display considerable skill, for from the down grade the cars must swing right around on themselves onto the upgrade. The road is wide at this point, measuring not less than 25 feet. All work must be done on the cars by the driver and his mechanic, and nothing can be taken aboard the cars except at the official stands. The general arrangement follows that of 1908, there being a long tire and gasoline pit in front of the grandstands, with a cement track immediately in front of it. Fuel, tires, etc., will be handed up to the men on the road.

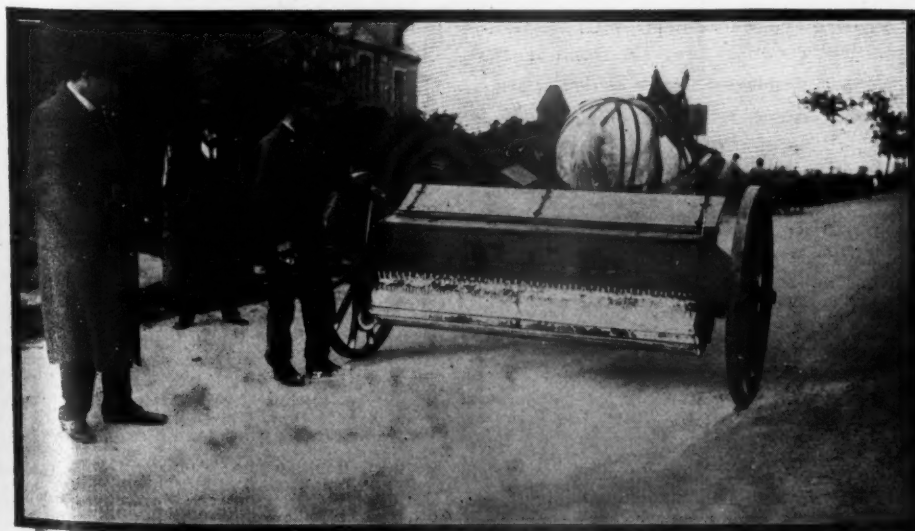
The experience gained in previous races has shown that tar-painted roads are most injurious to the eyes of the drivers, and as the race this year will last 2 consecutive days it has been decided to use calcium chloride. The work is being undertaken by the Akonia process, adopted by Akonia Limited, of London, England. As water is very scarce on the course, it has been decided to make use of the dry process, the calcium chloride being sprinkled on the 48 miles of road by chemical manure sprinklers about 3 days before the race, and a slight central sprinkling given on the eve of the race. The 48 miles of road, averaging 20 feet in width, will require about 180 tons of calcium chloride, and the cost will be about \$8,000. It is guaranteed that with this treatment the road will remain free from dust for a minimum of 10 days, and that there will be no injury to the eyes of drivers or to tires.

Very elaborate grandstands have been erected for the race. In the center of the main line of stands, built on the outside of the course, will be an open-air dining hall, at which it will be possible to dine and watch the race at the same time. To the left of this will be the official stands, and opposite the starting line will be the press box with telegraph operators on the ground floor and newspaper men on the upper story. Score boards will be on the opposite side of the course, the timers' box being united to the press stands by a pneumatic tube, and a passage way provided for officials by means of a tunnel. At every point where a cross road runs into the course stout boarding will be erected, and at intervals of about 5 or 6 yards military and gendarmes will be on duty.

It is estimated that the total amount spent on the organization of the race will be about \$80,000, of which amount \$20,000 has been granted in the form of a subsidy by the town of Dieppe.

DE PALMA AND BROWN SAIL

New York, June 4—Ralph de Palma and David Bruce-Brown sailed for Europe today for the purpose of driving in the French grand prix. De Palma, Brown and Wagner are the Fiat team.



SPRINKLING CALCIUM CHLORIDE ON FRENCH GRAND PRIX COURSE

Only Twelve Cities on Show Circuit

N. A. A. M. Decides to Support Cleveland, New York, Philadelphia, Detroit, Chicago, Minneapolis, Kansas City, St. Louis, Pittsburgh, Buffalo and Indianapolis

NEW YORK, June 4—An even dozen cities are included in the circuit of shows which will initiate the motor season of 1913, according to a plan announced by the National Association of Automobile Manufacturers this afternoon. The circuit has been arranged to eliminate conflict of dates and is so framed that if manufacturers wish to assist their local representatives by the loaning of polished chassis, salesmen or exhibition cars, they may do so without making excessively long jumps.

The idea is to cut out all participation by manufacturers in any other shows than those included in the circuit, and to allow such manufacturers only the same degree of latitude in exhibiting at the circuit shows as they have at present with regard to all local shows.

The heavy drain of past seasons on the manufacturers is one of the chief reasons for abridging their activity. The circuit project will be presented to the Motor and Accessory Manufacturers, and it is likely that similar action will be taken by that organization. The accessory makers, as such, have felt the drain of the long local show season.

The circuit, showing cities and dates and including the New York and Chicago shows, which are not part of the local show circuit, is as follows:

Cleveland	January 4-11
New York	January 11-18
Philadelphia	January 20-25
Detroit	January 27-February 1
Chicago	February 1-8
Minneapolis	February 10-15
Kansas City	February 17-22
St. Louis	February 24-March 1
Pittsburgh	March 3-8
Boston	March 8-15
Buffalo	March 17-22
Indianapolis	March 24-29

All the shows except New York, Chicago and Boston commence on Monday night.

ASK UNIFORM TRUCK GUARANTEE

New York, June 4—Twenty-two representatives of truck manufacturers held their second convention at N. A. A. M. headquarters today and recommended to the N. A. A. M. the adoption of the uniform guarantee adopted at the previous meeting, which includes a 90-day limit; provides for replacements only where defect of workmanship is discovered within the limit, and separates the warranties of replacement from the contract of sale. It also was recommended that a warning plate be placed on every truck turned out, containing the size designation, chassis weight, body allowance, useful load weight, total loaded weight and speed. A caption will read: "Caution: overloading and overspeeding will void your warranty."

The report of the committee on production and sale shows that up to January 1, 1912, eighty-two manufacturing concerns had made and sold more than 18,000 trucks of various types and styles, which, it is believed, represents about two-thirds of the total, or 27,000 trucks. The report stated that this fraction of the total number of trucks put out by American makers is valued at \$35,000,000.

The executive committee also met with representatives of the Society of Automobile Engineers and it was agreed that the S. A. E. shall co-operate on the standardization of units.

ENGINEERS PREPARE PROGRAM

Detroit, Mich., June 4—According to the tentative program already announced, the mid-summer meeting of the Society of Automobile Engineers in this city on June 27, 28, and 29, will be a most interesting one. The session should prove popular not only because of the papers, but also due to the new feature of the session in that, after opening a business session at Hotel Ponchartrain on Thursday, June 27, and visiting manufacturing plants in the afternoon, members of the society present will embark at 8 o'clock Thursday evening on a steamer for Mackinac island at the head of Lake Huron, returning to Detroit Saturday night. Professional sessions will be held on board the vessel City of Detroit during the trip, these sessions consisting of the reading of papers and discussions on them.

The local committee in charge of the arrangements has practically plans completed. The entertainment committee is headed by Howard E. Coffin, the finance committee by E. T. Birdsall, transportation by F. H. Floyd, and hotels by G. W. Dunham. The complete program follows:

Thursday Morning—Business session at Ponchartrain hotel.

Thursday Afternoon—Visits to manufacturing plants.

Thursday Evening—Embarkation on steamer City of Detroit No. 2, sailing at 8 o'clock for Mackinac island at the head of Lake Huron; returning to Detroit Saturday night.

Friday and Saturday—On board City of Detroit. Professional sessions will be held during the trip, at which the following papers and reports, among others, will be presented: "The Effect of the Relation of Stroke and Bore in Automobile Engines," John Wilkinson; "Motor Sizes and Drive Ratios for Commercial Vehicles," E. P. Batzell; "Cost of Work With Gasoline Motor Trucks," Louis Ruprecht; "Stability of Automobile Propeller Shafts," J. M. Thomas; "Standardization Work of the S. A. E.," Henry Souther, chairman of the standards committee; "An Exhaustive Motor Test," Herbert Chase, introduction by F. R. Hutton; "Test of Aluminum Alloys," H. W. Gillett; "Worm Gears," Frank Burgess; "Helical Gears," Frank Burgess; "Standardization of Drawings," George W. Dunham; "Test of a Knight Motor," R. C. Carpenter; "Leaf Springs," Leavitt Lane.

Reports of the following standards committee divisions: Broaches, carbureters, data sheet,

frame sections, iron and steel division, miscellaneous, sheet metals, springs division, truck standards division.

The society headquarters will be at the Ponchartrain hotel.

LATE EASTERN LITIGATION

New York, June 3—Recent agitation to simplify and shorten court procedure in patent litigation has served to bring about an example in the United States district court. It is proposed to take the testimony in the suit of Stromberg against Fletcher, involving the validity of the Stromberg patent covering the two-spring carbureter principle, before the court itself.

A motion to have such an order entered by the court was made this week by Albert M. Austin, attorney for the Fletcher company, and was entertained. In case this litigation is carried to a conclusion it is likely that a new record for brevity will be set. It is believed by the litigants that a full hearing of the case can be had in 30 days under the rule adopted.

Suit for alleged unfair competition has been filed in the United States district court on behalf of the Vehicle Apron and Hood Co. of Ohio, against the National Automobile Supply Co. of New York. The suit does not involve the validity of any of the patents held by the complainant or those used by the defendant company, but deals with the single element of confusion to the trade by reason of alleged similarity of product.

METROPOLITAN ENGINEERS MEET

New York, May 31—A paper which aroused considerable interest was read by H. H. Smith, electrical engineer of the Edison laboratory before the metropolitan section of the Society of Automobile Engi-

Coming Motor Events

June 6—Reliability run; Washington Post.
 *June 8—Track meet; Quaker City Motor Club; Narbeth, Pa.
 *June 8-9—Hawthorne track meet; Chicago, Ill.
 *June 11-13—Reliability run; Automobile Club of Washington, Washington, D. C.
 June 15—Track meet; Belmont Motor Club; Narbeth, Pa.
 *June 20—Algonquin hill-climb, Chicago Motor Club; Algonquin, Ill.
 *June 20-22—Reliability run, Pine Tree Motor Contest Association; Portland, Me.
 June—Reliability run; Auto Club of St. Louis, St. Louis, Mo.
 June—Hill climb; Maine Automobile Association; Portland, Me.
 June 25-26—Grand prix road race; Dieppe, France.
 June 27-28—Interclub match, Chicago Athletic Association and Chicago Athletic Club.
 June—Track meet; Baltimore, Md.
 June 27-29—Summer meeting Society of Automobile Engineers; Detroit, Mich.
 July 4-5—Track meet; Taylor Automobile Club; Taylor, Tex.
 *July 4-6—Beach meet; Old Orchard Automobile Association; Old Orchard, Me.
 July—Reliability run; Maine Auto Association.
 July—Reliability run; Cleveland News.
 July 4—Track meet; Petersburg, Ind.
 July 5-6—Road Race; Montamara Festo Auto Com.; Tacoma, Wash.
 July 10-20—Canadian Industrial Exhibit; A. C. Emmett, manager motor section; Winnipeg, Can.

Many in Studebaker Sociability Run

neers at its new meeting place in the United States Rubber building. The paper dealt exclusively with the manufacture of the Edison storage battery. The questions put to Mr. Smith after the paper had been read brought out the interesting work which is being conducted in the Edison laboratories. The most important result in the improvement of the battery which has been made lately, is the insulating and protective paint which preserves the can containing the battery. This was formerly subject to corrosion and the results were serious if this progressed to a marked extent.

GOODRICH CERTIFIES TO INCREASE

Albany, N. Y., June 5—Special telegram—The B. F. Goodrich Co. has certified to an increase in its capital stock from \$45,000,000 to \$90,000,000. The issues are divided into \$30,000,000 preferred and \$60,000,000 common.

COTTON IN POOR CONDITION

New York, June 3—The condition of the cotton crop on an average date of May 24, according to 1,977 replies of special correspondents of the Journal of Commerce and Commercial Bulletin, was poorer than it has been for the past 4 years. The condition was 76.9 per cent on May 24, compared with 83.8 per cent 1 year ago, 80.2 in 1910, 82.1 in 1909, 79 in 1908 and 69 in 1907. This is 6.9 per cent below last year at this time, which was the highest condition for 10 years.

Owing to the continuous rains, the season is unusually late and planting in many sections is incomplete. Preparation of the soil was greatly neglected in practically all sections except Texas, and weeds and grass are expected to give trouble later

Half-Hundred Cars Start from Phoenix, Ariz., for Grand Canyon—Owners Will Spend Several Days on Road and Will Be Entertained in Many of the Towns

PHOENIX, Ariz., May 31—Between fifty and sixty Studebaker cars, E-M-F and Flanders models, will leave Phoenix for the Grand canyon next Tuesday morning on the Arizona Motor Co.'s sociability run. In the party will be over 200 persons from Phoenix, Mesa, Tempe, Tucson and other points in the southern part of the state. Monday afternoon, beginning at 4 o'clock, the cars that are to take part in the run will parade through the streets of Phoenix. In the parade will be two repair machines which the company will send along on the run, laden with gasoline, oil, tires, spare parts and other accessories. They will be manned by two crews of expert mechanics.

The run is to be held under the sociability rules of the A. A. A. George Purdy Bullard will act as referee for that organization. A. J. Moore, chief of police of Phoenix, will act as starter; Harry Welch will check the cars out of Phoenix and they will be checked in at the St. Michael hotel, Prescott, by Don L. Peake that evening. Lunch will be taken on the road the first day. Prescott, 130.4 miles distant, will be reached during the afternoon. The

citizens of that city will greet the motorists with a brass band. Wednesday forenoon will be spent in Prescott and that afternoon the cars will travel to Ash Fork, 67 miles farther on. The next morning the run to the canyon, 72 miles from Ash Fork, will be completed. Thursday night the motorists will be guests of the Studebaker Corporation at a banquet to be given in El Tovar hotel. Friday will be spent at the canyon and Saturday morning the return trip, which will be by way of Flagstaff, will be commenced. The Flagstaff people have rented the opera house and will give a reception there in honor of the travelers. All of Sunday will be spent in picnicking on Walnut Creek, a short distance from Flagstaff.

Williams will be reached by noon Monday and the motorists will be guests of the people of that place at an old-fashioned barbecue. The following night they will be at Prescott, where they will be tendered a banquet. Wednesday evening, 8 days from the time of starting, will see all the cars back in Phoenix. Nothing like this run has ever been attempted in a motoring way in the west.

on. Stands where obtained are rather spotted, but a fair start is assured in most sections. It is fair to assume that a good crop will be raised this year, conditioned, of course, upon favorable weather. The condition by states in the last week of May for this year and the past 4 years is given below:

CONDITION BY STATES

	1912	1911	1910	1909	1908
North Carolina..	84.1	82.3	84.7	86.4	87.6
South Carolina..	79.0	74.0	77.3	83.4	80.2
Georgia	74.0	89.3	79.3	83.0	78.0
Florida	72.4	97.6	76.7	94.3	80.3
Alabama	71.8	86.0	81.2	82.0	78.0
Mississippi	70.6	81.7	75.7	75.4	75.1
Louisiana	71.0	83.5	71.5	70.0	74.3
Texas	81.8	83.1	82.7	83.1	76.7
Arkansas	72.3	82.4	78.6	83.5	79.6
Tennessee	73.5	81.3	79.6	86.7	82.6
Missouri	73.3	79.5	81.6	88.7	81.5
Oklahoma	78.7	87.2	85.1	87.7	85.7

Average 76.9 83.8 80.2 82.1 79.0

FRENCH HILL-CLIMB RESULTS

Paris, May 25—Last year's record was broken by Grua in a four-cylinder Bayard-Clement of 6 by 6.2 inches bore and stroke in the 2.3 miles climb up Limonest hill, near Lyons. The previous record had been held by Deydier in a Cottin-Desgouttes, in 2 minutes 25 seconds. The Bayard-Clement made the climb in 2:24.7, and last year's champion failing to improve on his own time, the fastest performance of the day remained with Grua. Deydier, in a Cottin-Desgouttes of 5.5 by 6.2 inches, was second in position with 2:25 4-5. In its own class,

a Bugatti of 4 by 6.2 was first with 2:30, beating a Cottin-Desgouttes and an Excelsior. A Cottin-Desgouttes won in the 3-inch bore class, beating a Hispano-Suiza of 3 by 7 inches bore and stroke, and in the two small racer classes Pilain cars were first.

TRACK MEET AT BENNING

Washington, D. C., June 1—With nearly 10,000 people in attendance the National Capital Motor Cycle Club gave a combined motor car and motor cycle race meet at Benning track Memorial day. Three motor car and six motor cycle events made up the program. The chief motor car event of the day was the free-for-all event at 20 miles, which was won by Cleveland Campbell in a Cole, the time being 28:51. Pitted against the Cole was a Warren, Reo, Warren and Ford. The first race at 10 miles was won by F. E. Miller in an Everitt, the time being 15:30. The Warren finished one, two in the second race, Barber's time in the winning car being 15:05.

REDDEN JOINS METZGER

New York, June 4—C. F. Redden, for 5 years the New York sales representative of the Studebaker line, has resigned to take the eastern sales managership of the Metzger Motor Car Co. Mr. Redden's territory will include New York and New England.

Scheduled for 1912

July 15—Reliability run; Wisconsin State Automobile Association; Milwaukee, Wis.
 July 22-27—Cadillac celebration at Detroit, Mich.
 *August 8-10—Galveston beach meet; Galveston, Tex.
 *August 23-24—Road races; Chicago Motor Club; Elgin, Ill.
 *September 2—Speedway meet; Indianapolis, Ind.
 *September—Commercial vehicle run; Chicago Motor Club.
 September 17—Vanderbilt and Pabst cup road races, Milwaukee, Wis.
 September 21—Grand prix and Wisconsin Motor cup road races, Milwaukee, Wis.
 September 17-20—Fire engineers' convention; International Association Fire Engineers; Denver, Colo.
 September 23-Oct. 3—Rubber show, Grand Central palace, New York.
 September 26-Oct. 6—Exposition agricultural motor cars; Bourges, France.
 September—Track meet; Universal Exposition Co., St. Louis, Mo.
 *October 7-11—Chicago Motor Club reliability run; Chicago.
 October 12—Track meet; Rockingham park; Salem, N. H.
 November 6—Track meet; Shreveport Automobile Club; Shreveport, La.
 December 7-22—Paris salon.
 January 11-25, 1913—Show in Madison Square garden and Grand Central palace; Automobile Board of Trade, New York.
 *Sanctioned by A. A. A.

Boston Car Dealers Face New Problem

Act of Alvan Fuller in Registering His Name as Asset Calls Attention of Trade to Possible Method of Preventing Makers from Taking Away Agencies

BOSTON, Mass., June 1—Boston dealers are interested in the action of Alvan T. Fuller, who today went to Boston's city hall and registered the name Alvan T. Fuller and the Packard Motor Car Co. That it would cause some comment Mr. Fuller reasoned and so he sent out the following statement:

"I am registering at the city hall, Boston, the name Alvan T. Fuller, doing business under the name of the Packard Motor Car Co. of Boston. This means just what it says, and is in no sense a move to incorporate, or a partnership, but is done in the belief that the above name has commercial advantages over that of the individual, especially in new territory where I may establish agencies. I have sold this year in Boston, Providence, Worcester, Portland and Buenos Ayres more than \$4,500,000 of motor cars and accessories."

In making this new move Mr. Fuller has set the others guessing in the Boston dealers' colony, and that others will wake up to the advantages of doing it, too, and follow suit there is little doubt. Some of the dealers have been wondering just where they would fit if the makers continue their policy of changing over to branch houses as they note how successful the dealers have been and what a fine territory New England is with Boston as the distributing center.

Not long ago one of the prominent dealers—not Mr. Fuller—who had been approached by a big real estate firm that wanted to build him new salesrooms and a service depot in the Back Bay sent for his attorney and he put the question up to him whether or not in case the makers decided to form a branch and drop him if he would have any redress in the equity court for building up a business and which really was his own. His attorney stated that he would go into the matter thoroughly and give him an opinion shortly. The lawyer has not yet finished delving into the statutes, and meanwhile the dealer is holding off on the new service and salesroom proposition.

The attorney told the agent that his opinion, without having had a chance to go into the matter, would be perhaps inclined to favor a certain right in the agency as one of property. He said that the equity laws of the Bay State were regarded as very good ones and many other states had copied them, and that they were drawn to protect the individual. So as an individual had built up a business that business could not be destroyed without compensation, and where a motor car manufacturer dropped an agent who had

built up trade the agent would have some redress.

Just what would happen after any agent has registered his name at city hall, and that of the car he represents, in case a maker should take a notion to make a change is what Boston dealers want to know. Unless the change was satisfactory to both parties there probably would be a lawsuit and then the matter would be settled for good, it is thought.

INDIANAPOLIS BUILDING ACTIVITIES

Indianapolis, Ind., June 3—A long time lease has been taken by the Henderson Motor Car Co. of Indianapolis on the factory property occupied for many years in that city by the National Casket Co. The factory is at West and Fourteenth streets and is four stories high. It has a frontage of 212 feet in West street and of 106 feet in Fourteenth street. There is about 5 acres of ground in addition to the floor space. The Henderson company will begin the manufacture of the new Henderson in the factory at once.

Ground at the southwest corner of Capitol avenue and Walnut street has been purchased in Indianapolis by the Goodyear Tire and Rubber Co. for \$20,000. During the summer the company will erect a five-story building, which it will occupy for offices and display rooms. The building will cost about \$50,000. At the present time the Indianapolis sales branch of the company is at 249 North Pennsylvania street.

The Nordyke & Marmon Co. of Indianapolis, within the next 2 weeks, will begin extensive additions to its plant. A new two-story office building, 43 by 155 feet, will be erected, the executive and general offices to be on the first floor and the drafting rooms on the second floor. Two additional stories are to be erected on building G. These stories will be 52 by 243 feet, giving the company about 25,300 square feet of additional building space.

GOODYEAR STOCKHOLDERS APPROVE

Akron, O., June 3—The latest big move in the rubber industries of this city was made last week by the Goodyear Tire & Rubber Co. when the stockholders of that company ratified the action of the directors in increasing the stock from \$6,000,000 to \$15,000,000. Of this amount \$5,000,000 is to be preferred stock and \$10,000,000 in common.

The Goodyear company has plans for doubling the capacity of its plant. New buildings are now under way of construction. The reason for the increase in capital stock, said Frank A. Seiberling, pres-

ident of the company, is due to the big increase in business which is growing at a pace double of that of last year. The stockholders took definite action to dispose of the preferred stock in the treasury by giving the common stockholders the right for their pro ratio share at par. This must be on or before June 10 and any stock not taken at that time the directors are empowered to sell at the best price obtainable but not less than par.

STUDEBAKERS RELEASE PELLETIER

Detroit, Mich., June 3—The reorganization of several departments of the Studebaker Corporation's motor car division and the Metzger Motor Car Co. has been a fertile theme for local gossip here for several days. The latest development is an announcement by General Manager J. N. Gunn of the Studebaker forces, stating that E. LeRoy Pelletier has been relieved of his duties as advertising director and is no longer connected with the firm. This department is now in charge of W. S. Pettit, who has been with the Studebakers for a year and a half.

Mr. Gunn also announces the appointment of Charles Gordon as factory manager, replacing Charles Adams, who has been with the Studebakers for several years, coming from Port Huron, where he had charge of the plant where the rear axles for the Studebaker cars are made.

It is locally believed that the Metzger company, through Mr. Pelletier and Paul Smith, the former Studebaker sales manager, will make a vigorous campaign to secure for their concern a large number of the Studebaker dealers, as soon as the plants of the concern are in shape to materially increase their output which, up to date, has always been a conservative one. This belief is strengthened by the fact that President Everitt of the Metzger company has just bought the abandoned plant of the Detroit Motor Boat Club, near the waterworks, giving for it a sum in excess of \$10,000. This plant affords ideal opportunities in the way of entertainment. There is an immense and attractive dining room with ample cafe attachment. Lounging rooms and other facilities abound, and it would not require great time or expense to transform the property into a sort of private hotel.

The Metzger company has secured a number of the former Studebaker branch managers, all of whom have been promptly replaced. As yet the Studebaker people say they have not lost a dealer to the Smith campaign, and claim that there are features of the effort which have greatly strengthened them in the esteem of their distributors.

The past few days have seen the lines very plainly drawn and it is not believed that there will be a further change of personnel. Although Walter E. Flanders has

Fire Destroys Lion Company's Plant

not yet allied himself with the Metzger company, he has practically turned over his office to Mr. Gunn and has been devoting a large share of attention to his Pontiac enterprises. There have been a number of changes in department heads of the Flanders Mfg. Co. plants, designed to manufacture electrics and motor cycles, it is announced.

An interesting feature of the situation is the fact that all the Studebaker plants are running at top speed, shipping in the neighborhood of 100 cars of both E-M-F and Flanders types to the firm's dealers all over the country.

HENDERSON CAR CHRISTENED

Indianapolis, Ind., June 3—The Henderson, a newcomer, was formally christened in an interesting manner in this city last Wednesday noon. The Henderson is being manufactured by the recently organized Henderson Motor Car Co. and the ceremony attending the christening of the car was the first of its kind ever held in this city, if not the first in Indiana.

Preceding the christening, which took place in Monument place, there was a parade in which about fifty motor cars representing motor car factories and private owners participated. Each car carried a pennant, welcoming the Henderson to Indianapolis. Following the Henderson, which was beautifully decorated with flowers, were Mayor Samuel L. Shank and Superintendent of Police Martin J. Hyland, riding in a snow-white Cole.

In front of the Soldiers' and Sailors' monument, which is the distinctive feature of the city, Mayor Shank, in commemoration of his well known fight against the high cost of living, emptied a peck of potatoes over the Henderson's hood and stuck a potato of enormous size on the radiator cap. Then with a large pencil he wrote on the hood, "I christen thee Henderson—Lew Shank, mayor of Indianapolis."

The Henderson then was escorted to the Claypool hotel, where it was placed in the hotel lobby until Friday evening. This is the first time a motor car has ever been exhibited in the lobby of an Indianapolis hotel.

The Henderson Motor Car Co. has options on two factory sites in this city and expects to formally announce its new site and factory plans in a few days.

TRUCK PLANT FOR ELKHART

South Bend, Ind., June 3—Elkhart is assured of a new plant where more trucks will be manufactured. Herbert E. Bucklen and his son, H. E. Bucklen, Jr., will be sole owners. The institution is to be known as the Bucklen Auto-Truck Mfg. Co., with headquarters in Chicago and Elkhart. Five different models are to be manufactured.

Blaze at Adrian, Mich., Causes \$400,000 Damage, and Upsets Makers Plans—Proposition Made to Remove to Detroit and Continue Manufacturing Cars

ADRIAN, Mich., June 3—Fire of unknown origin early Sunday morning destroyed the plant of the Lion Motor Car Co., causing the death of one man, serious injuries to another and a monetary loss estimated at nearly \$400,000. The company carried insurance amounting to \$180,000. Three hundred men are thrown out of employment and valuable models of 1913 models have been destroyed. The fire was discovered in the final assembly room.

In the shipping rooms were thirty new cars which were to have been shipped Monday.

The only portion of the plant saved was a very small section of the machine shops. The building and machinery destroyed was valued at \$150,000 and the stock, which was a total loss, was valued at between \$175,000 and \$200,000.

The Lion Motor Car Co. was organized in Adrian in 1909. The officers are: President, Austin E. Morley, Detroit; vice-president, Fred Postal, Detroit; secretary, L. B. Robertson, Adrian; treasurer, W. H. Shierson, Adrian. Among the directors are Chief Bowen of the local fire department, Thomas Newton of Detroit and Alfred Easter of Detroit.

Plans for the future have not been definitely decided upon but it is possible the company may remove to Detroit, this plan being favored by a number of the stockholders. Vice-president Postal declared himself in favor of the removal.

Incidental to the fire it was discovered

that the Lion company had placed contracts for material for the manufacture of 2,000 cars of a lighter type than the present model and designed to sell at a greatly lower price. These contracts, it is admitted, will have a pronounced bearing on the situation, increasing the probability that the firm will rebuild.

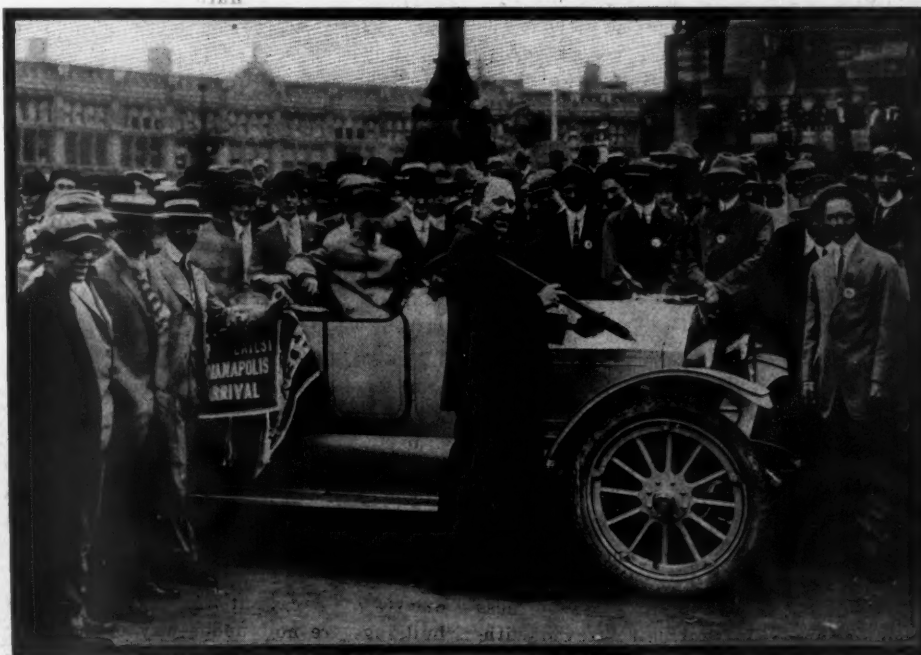
Plans Move to Detroit

Detroit, Mich., June 3—Local directors of the Lion Motor Car Co. have returned from an inspection of the burned plant of the company at Adrian, and are now in consultation over the future plans of the company. Several of the directors favor moving the plant to Detroit and have gone so far as to secure an option on a building here. A strong effort is being made by the Adrian men interested in the plant, to secure a rebuilding in that city.

The old plant of the Lion company is a total loss and the directors place the damage at \$400,000, of which \$180,000 is covered by insurance.

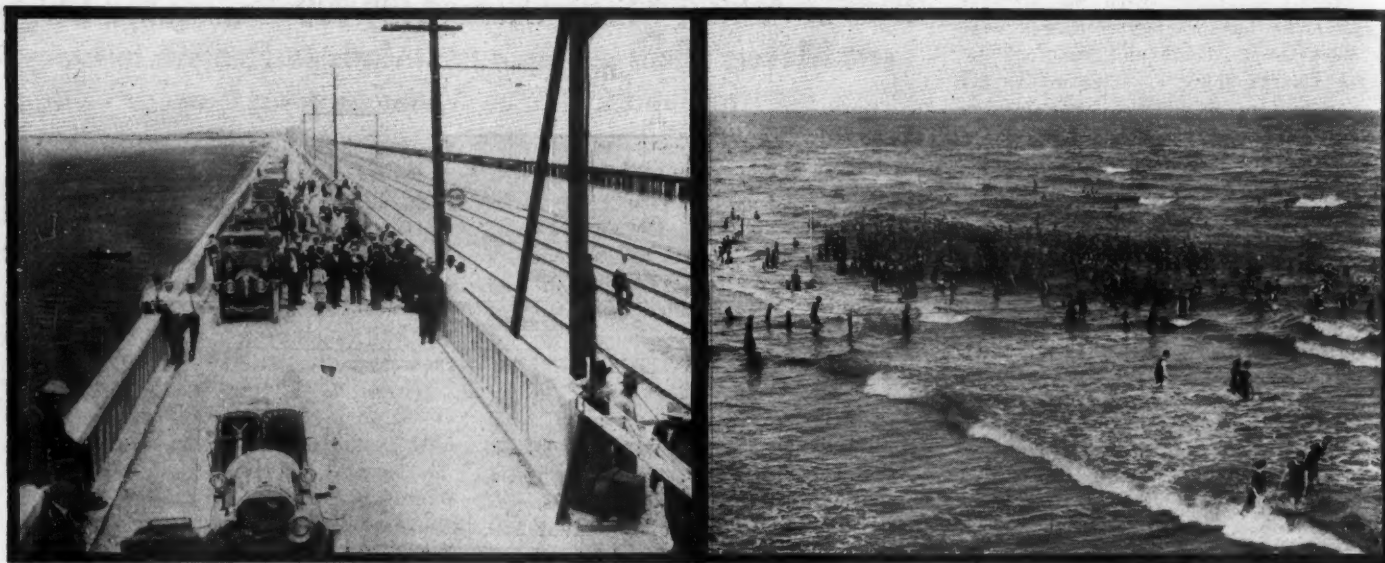
DE TAMBLE RECEIVER DEMANDED

Indianapolis, Ind., June 3—The U. S. Ball Bearing Mfg. Co. has filed suit in the Madison county circuit court at Anderson, Ind., asking that a receiver be appointed for the DeTamble Motors Co. of that city. The action is brought on an account of \$750 and it is alleged that the motor car company is in imminent danger of insolvency, has a large bonded indebtedness it cannot meet and that it has permitted its current accounts to go unpaid.



MAYOR SHANK OF INDIANAPOLIS DEDICATING NEW HENDERSON CAR

Galveston Causeway Open to the Public



MOTOR PARADE ON GALVESTON CAUSEWAY AND CROWDS IN BATHING

GALVESTON, Tex., May 31—No fewer than 30,000 people witnessed the mammoth motor parade last Saturday marking the official opening of Galveston's \$2,000,000 causeway to the traffic of Texas. Twelve hundred cars in one line is a sight not witnessed often in any part of the country and Saturday's parade will go down in the history of Texas motordom as the greatest galaxy of four-wheeled pleasure craft ever assembled together in the southwest.

It was a magnificent array of cars of all makes and sizes that filed across the great earth, steel and concrete structure that forever links Galveston island with the mainland of Texas and they made a beautiful sight as they glided, serpentine-like, over the 53 miles of smooth-surfaced shell road that now connects Houston with Galveston.

The mammoth parade, headed by Governor Colquitt and followed by state, county and city officials and representative citizens of all parts of Texas, was between 12 and 15 miles in length and carried at least 7,500 people. The governor's car entered the mainland end of the causeway at 10:55, and breaking the ribbon of silk and oleander blossoms, flowers typical of the coast country, was closely followed by the long array of cars that consumed 2 hours 35 minutes in passing the reviewing stand.

Motoring was having its day of triumph as well as the cities of Houston and Galveston. The motion-picture camera that hummed and whirled as it copied down the living record of the great motor procession was gathering for a dozen nations and millions of their people the story of the motor car's perfection.

The significance of the completion of this great causeway to motordom lies in

Texas Motorists Now Have Big Bridge 10,675 Feet in Length

the fact that heretofore the motorists of Galveston were confined to the limits of the roadways on the island on which the city is located, the only means of reaching the mainland being by the ferry route, which was more than a handicap.

As a fitting climax to the great event the Galveston contingent tendered their visitors with a reception and dance at the Galvez hotel during the evening, which brought to a close the biggest day in the history of the city of Galveston.

The great causeway is constructed of concrete, and is 10,675 feet long by 119 feet wide at the top of the roadway. It has a roller lift bridge, 45 feet wide by 100 feet long, weighing 3,283,000 pounds, the largest of its kind in the world. Material used in construction are: Reinforced metal, 2,620 tons; tie rods, 625 tons; concrete, 74,400 cubic yards; filling, 806,600 cubic yards; concrete filling, 172,081 lineal feet; wooden pilings in foundation, 246,820 lineal feet; gravel, 60,000 cubic yards; sand, 30,000 cubic yards; cement, 81,500 barrels.

FRENCH STILL DRIVE ON RIGHT

Paris, May 25—The recommendation of an expert committee that the rule of the road in France should be changed from right to left, and the approval of this change by the French government has led to a general belief that during the present year all vehicles in France would be obliged to adopt the English road rule. No such change has been made, nor is likely to be made during the present year. The expert committee concluded that driving on the left, as in England, was preferable

to driving on the right, as is done in France and America. The government, having appointed this committee, could only accept its recommendations, but between what is theoretically the best and what is practically desirable, there is an important gap. Afraid to make the change, the whole matter of traffic reform has remained in suspense and Frenchmen continue to drive on the right. It is quite probable that the practice will be continued for years.

KENTUCKY GOOD ROAD MOVEMENT

Louisville, Ky., June 3—Wholesalers of motor cars in Louisville report that, despite the great need of better highways in the mountains of southeastern Kentucky, this section ranks with other parts of the Bluegrass state in the matter of purchasing cars. Owners of motor vehicles have become good roads advocates in this region and in the adjacent section of Virginia. These motorists and others interested in highway improvement are arranging for a convention to be held in Bristol-Va.-Tenn., this summer to consider plans for a highway from Bristol to Lexington, Ky.

Bell county is preparing to vote on a bond proposition and other counties are preparing to take similar action. Across the border in Virginia several counties are setting Kentucky a good example in road building. According to a dispatch received here, a network of macadamized highways is being constructed through the counties of Lee, Wise, Wythe, Smyth, Washington, Scott and Russell. Wise county is spending \$700,000 in building turnpikes; Smyth, \$100,000; Russell, \$425,000; Washington, \$200,000, and Lee, \$364,000. This expenditure indicates that the people of Virginia are very much in earnest on the road question.

The mountain counties of Kentucky are

Wolverines Enjoy Their Lengthy Tour

sorely in need of better highways. Many of these counties are now making rapid progress because of the advent of the motor car and by reason of the extensive development of the immense coal beds that is under way in the eastern portion of the state. There are gratifying indications that a great number of the people who reside in the mountain districts are fully alive to the situation.

GEORGIANS TACKLE ROAD SCHEME

Atlanta, Ga., May 28—One of the most ambitious road building schemes ever projected in the south was launched at Cornelia, Ga., yesterday when more than 1,500 enthusiasts met, at the call of the Habersham County Good Roads Association and organized the Piedmont Highway Association. The main object of this newly formed body is to promote and finance the building of a good road from Atlanta, Ga., to Greenville, S. C., along the line of the Southern Railroad, with a branch road also to Asheville. Such a road would run through some of the most picturesque—perhaps the very most picturesque—in all the southland. William Eberhart of Cornelia is president and Plumer Duckett, Cornelia, secretary and treasurer of the association.

LOWER ILLINOIS ROADS BAD

St. Louis, Mo., June 3—Lower Illinois roads, especially the National highway, are very bad, according to those who attempted to make the trip from St. Louis to the Indianapolis race in their motor cars. Only three cars out of about twenty that started got through to Indianapolis. The rest were all shipped in from Illinois towns. According to one of the drivers who tried to make the run, there was at least 4 feet of sticky gumbo and no bottom on most of the roads they tried to go over. Four horses were unable to even pull an empty wagon over part of the road. Then, when they saw this the party gave up the trip.



LIFT BRIDGE ON GALVESTON CAUSEWAY

Fifty-one Detroit Cars Travel to Indianapolis and Back in Club Sociability

DETROIT, Mich., June 3—The Wolverine Automobile Club of this city believes it has solved the tour problem, with its recently perfected plan of non-penalized sociability event. Just fifty-one cars, owned and driven by members of the club, toured down in this way to the Indianapolis 500-mile race, and all report a most enjoyable run.

The Detroiters made a formal start at 8 o'clock Tuesday morning, May 29, from Grand Circus park. The cars were sent away at half-minute intervals, and the first day's run was to Fort Wayne, Ind., the trail leading through Wayne, Ypsilanti, Adrian, Wauseon and Defiance. There was no noon control, the cars stopping for lunch for the crews wherever the surroundings seemed to attract. The day was rainy and the roads were very heavy.

Quarters had been arranged for the party in advance at Fort Wayne. Immediately after breakfast Wednesday the tourists

continued their way to Indianapolis, where they arrived at night, after taking lunch as guests of the Remy Electric Co. at Anderson. The roads were in better shape and the run was without incident. By unanimous consent a pacemaking car preceded the tour to act as a guard against speeding.

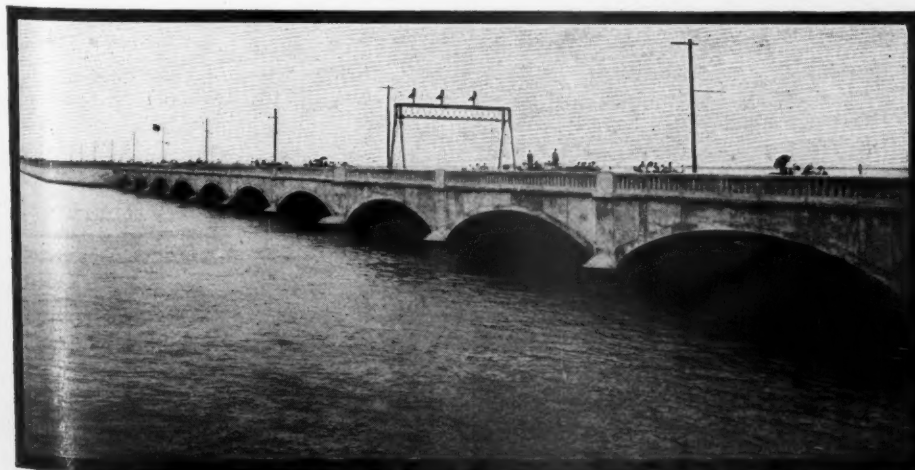
At Indianapolis the entire party was quartered at the Claypool and a special dining room was set apart for the use of the Detroiters—this latter a provision against the recurrence of a difficulty which regulars at the race will thoroughly appreciate. Seats for more than 200 of the tourists had been secured in the main stand at the speedway.

The return trip was made by a different route, with Dayton as the night control. This left a run of 264 miles to Detroit on Saturday, and an early start was ordered. The last day was made a go-as-you-please. Some of the cars made remarkable time, while others contented themselves with slower progress. A few remained for the night at Toledo, concluding on Sunday.

A unique feature was the fact that the tour was escorted for the entire distance by two of Detroit's traffic squad.

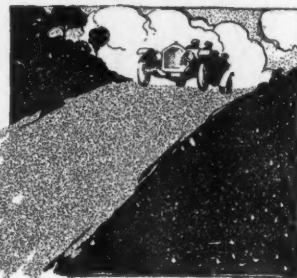
TRUCK PARADE PLANNED

Philadelphia, Pa., June 1—With the indorsement and co-operation of the Philadelphia Automobile Trade Association, the Philadelphia Inquirer will on Thursday, June 20, repeat the commercial motor vehicle parade and exhibit which was so successfully conducted on June 8 of last year, when 304 entrants representing fifty-six different makes of trucks took part. The parade and exhibit will follow the rules and regulations governing last year's event. It will not be a contest in any sense of the word, no entrance fee being required and no prizes being distributed. The parade will start at 10 o'clock in the morning and the route will be over the principal thoroughfares of the city, lasting about 2 hours.



GENERAL VIEW OF GALVESTON CAUSEWAY

Routes and Touring Information



TOLEDO TO CHICAGO

TOLEDO, O.—Editor Motor Age—Kindly publish the best roads for touring from Toledo, O., to Chicago; also state road conditions in rainy weather.—A Subscriber.

Leaving Toledo and motoring via Wauseon, Archbold, Bryan and Edgerton in Ohio, Kendallville, Ligonier, Goshen, Mishawaka, you will have macadam or gravel road practically all the way to South Bend, with gravelly dirt road to LaPorte, which under ordinary conditions is good but liable to be soft after heavy rains. Continuing from LaPorte you will have macadam road the remainder of the trip, which will take you through Westville, Valparaiso, Merrillville, Schererville, Highlands, Hessville, East Chicago, South Chicago into the city of Chicago.

VIRGINIA TO WISCONSIN

Milwaukee, Wis., Editor Motor Age—Please give me speedometer readings and general information regarding the two best routes from Richmond, Va., to Milwaukee.—A. J. Forbes.

For speedometer readings and running directions it is advisable to procure Blue Books, volumes 3 and 4. Volume 3 takes you as far as Washington, Pa., and volume 4 the balance of your trip.

It is a distance of 212 miles to Winchester, Va., by way of Staunton, motoring through Glen Allen, Goodall, Montpelier, Jackson, Pemberton, Gardner, Cuckoo, Louisa, Trevilians, Mechanicsville, Whitlock, Cobham, Gordonsville, Cismont, Keswick, Shadwell, Charlottesville, Wood's, Ivy, Mechum, Brownsville, Yancey, Afton, Rock Fish Gap, Basic City, Waynesboro, Fishersville, Pinchtown, Staunton, Mount Sidney, Burkstown, Mount Crawford, Harrisonburg, Lacey Springs, New Market, Mount Jackson, Edinburg, Woodstock, Maurertown, Tom's Brook, Strassburg, Middletown, Stephen City, Winchester, Va.

Continue to Hagerstown, Md., 20 miles, through Bunker Hill, Clarksville, Martinsburg, Berkeley, Falling Waters, Williamsport and Hagerstown.

There is fair dirt to Staunton with several clay stretches; one hard, rocky climb over Rock Fish Gap with a magnificent view of the Alleghenys at top of Blue Ridge. The balance of the way to Winchester there is a stone road practically all the way. Charlottesville is famous as the home of Thomas Jefferson and you will pass the old home, called Monticello.

Should the road to Cumberland be closed, it will necessitate your making a detour 23 miles to Chambersburg through Cearfoss, Greencastle, Marion; 56 miles to Bedford through Ft. Loudon, McConnellsburg, Harrisonville, Breezewood, Everett, Mt. Dallas; to Cumberland, 30 miles, through Bedford Springs, Centerville. Otherwise it is only 66 miles to Cumberland on the National highway through Clear Springs, Indian Springs, Hancock, Belle Grove, Gilpin, Flintstone, Martins Mountain.

Cumberland, Md. to Wheeling, W. Va. routes through Eckhart Mines, Frostburg, Grantsville, Keyser, Oakton, Addison, Farmington, Fayette Springs, Laurel Ridge,

Hopwood, Uniontown, Haddonfield, Davidson, Brownsville, Centerville, Beallsville, Washington, Claysville, West Alexander, Elm Grove, Wheeling, a distance of 133 miles.

To Columbus, O., over the National highway, a distance of 188 miles, you will route through Bridgeport, St. Clairsville, Loydsville, Morristown, Hendricksburg, Fairview, Elizabethtown, Washington, Cambridge, New Concord, Norwich, Zanesville, Mt. Sterling, Hopewell, Gratiot, Brownsville, Linnville, Jacktown, Hebron, Kirksville, Etna, Reynoldsville, and Columbus.

You can make Chicago in two days, Fort Wayne the first day's destination a distance of 153 miles through Dublin, New California, Marysville, Middleburg, Zanesville, Bellefontaine, Huntsville, Roundhead, Holden, Westminster, Lima, Elida, Scott's Crossing, Delphos, Van Wert, Fort Wayne. The direct route into Chicago has about 20 miles of poor road and sand just beyond the Kankakee river, and to avoid this you can make a detour to South Bend and it will only lengthen the stretch by 12 or 15 miles. You will pass through New Carlisle, LaPorte, Pinhook, Westville, Valparaiso, Wheeler, Hobart, Highlands, Hessville, Gibson, Grasselli, East Chicago, Whiting, South Chicago, Bryn Mawr, Jackson park, Washington park and Chicago.

The Chicago-Milwaukee stretch is outlined in a communication headed Chicago in this issue.

Two entirely different routes may be taken from Wheeling, W. Va. One would be by way of Cleveland and Toledo, a distance of 428 miles over a good dry weather road. This itinerary is—Bridgeport, Rayland, Warrenton, Brilliant, Steubenville, Wintersville, Richmond, East Springfield, Amsterdam, Harlem, Carrolton, New Harrisburg, Magnolia, Industry, Canton, New Berlin, Greentown, Uniontown, Springville, Akron, Ghent, Brecksville, Independence, Cleveland, Rock River, West Dover, Lorain, Vermillion, Ceylon, Huron, Sandusky, Castalia, Clyde, Fremont, Woodville, Toledo, Crissey, Delta, Wauseon, Archbold, Stryker, Bryan, Edgerton, But-



VALLECITOS PASS IN ALAMEDA COUNTY, CALIFORNIA

ler, Waterloo, Kendallville, Brimfield, Wawaka, Ligonier, Benton, Goshen, Dunlap, Osceola, Mishawaka, and South Bend where you take the route outlined previously.

Your second option leaves the route first outlined at Columbus, O., and continues on the National highway to Indianapolis, Lafayette and Chicago, and is a distance of 379 miles through Alton, W. Jefferson, Lafayette, Summerford, Brighton, Vienna, Harmony, Springfield, Donnelsville, Forgy, Brandt, Fountaine, Tadmore, Vandalia, Englewood, Arlington, Lewisburgh, Gettysburg, Richmond, Centerville, Germantown, Cambridge City, Dublin, Strawn, Lewisville, Dunreith, Ogden, Rausville, Knightstown, Charlottesville, Cleveland, Greenfield, Cumberland, Indianapolis, Clemont, Brownsburg, Lizton, Jamestown, New Ross, Crawfordsville, Romney, Elston, Lafayette, Montmorenci, Wolcott, Remington, Rensselaer, Aix, Virgie, Thayer, Shelby, Crown Point, Schererville, Highlands, Hessville, Gibson, Grasselli, East Chicago, Whiting, South Chicago, and Chicago.

FT. WORTH TO LOS ANGELES

Fort Worth, Tex.—Editor Motor Age—Please give me the best route from Ft. Worth to Los Angeles, Cal.—C. M. Wood.

The route from Texas to California would be too hot for comfort should you defer your trip later than June, unless you want to spend 2 weeks on the road, practically doubling the distance by routing through Oklahoma, Kansas, Colorado, Wyoming, Utah, Nevada and California. Either one is in the Blue Book, volume 5, with running directions.

The southern route leaves Ft. Worth and takes in Ben Brook, Aledo, Annetta, Weatherford, Mineral Wells, Palo Pinto, Breckenridge, Albany, Abilene, 176 miles. To Big Spring is 111 miles through Tye, Merkel, Trent, Sweetwater, Roscoe, Lorraine, Colorado, Westbrook, Iatan, Coahoma and Big Spring. Fort Stockton is 178 miles distant and is reached by motoring through Stanton, Midland, Odessa, Grand Falls and Fort Stockton. Fort Stockton to Sierra Blanca, 223 miles, routes through Marathon, Alpine, Marfa, Aragon, Valentine, Wendell, Chispa, Lobo, Dalberg, Chocar, Torbert, Grayton, Sierra Blanca. Continue 93 miles to El Paso via Etholen and Lasca. El Paso to Deming, N. M., 105 miles—Deming to Wilcox, Ariz., 137 miles—Wilcox to Phoenix, 216 miles.

The itinerary to Phoenix is Canutillo, La Tuna, Berino, San Miguel, Aden, Cambray, Deming, Tunis, Gage, Willa, Separ, Lordsburg, Vanar, San Simon, Bowie, Cholla, Luzena, Glade, Wilcox, Cochise, Dragoon, Benson, Mescal, Vail, Wilmot, Tucson, Red Rock, Florence, Superior, Mesa, Tempe, Phoenix. To Mecca through Coldwater, Buckeye, Palo Verde, Winters Wells, Harrisburg, Salome, Vicksburg, Quartzite, Ehrenburg, Blythe and Mecca it is 267 miles.

Continue on to Los Angeles through Burbrow, Thermal, Coachella, Indio, Palm Springs, Whitewater, and over a good hard road to Banning and Beaumont, and a macadam roadway into Los Angeles, through Redlands, San Bernardino, Colton, Riverside, Bloomington, Rialto, Etiwanda, Cuckamonga, Upland, Ontario, Pomona,

Puente, Bassett, Elmonte, Savannah, San Gabriel, Pasadena and Los Angeles. Between Whitewater and Los Angeles you will have 133 miles of excellent roads.

Just west of El Paso you will strike a long sand hill after crossing the Rio Grande river. It is not steep but sandy. The roadbed in general to Phoenix is a hard, dry soil over rolling mesas, across valleys and through mountains of magnificent scenery. On to Salome there is a gravel trail, and with the exception of a few sandy stretches the road is a hard surfaced one, mostly gravel to Mecca. Until within a short distance of Banning you have sandy stretches, hard road, turnpike, more sandy road, etc.

CHICAGO TO MILWAUKEE

Chicago—Editor Motor Age—I would like a route from Chicago to Milwaukee.—W. J. Horn.

The shore route lies through Evanston, Kenilworth, Glencoe, Hubbard's Hill, Ravinia, Highland Park, Highwood, Lake Forest, Lake Bluff, Waukegan, Zion City, Winthrop Harbor, Kenosha, Racine and Milwaukee. You will find these roads macadam or gravel about two-thirds of the way, but many parts are badly worn and in need of repair. There are some stretches of sand and dirt beyond Waukegan.

A second route lies through small towns and there are numerous long, straight stretches. The road leads through Evanston, Wilmette, Grosse Point, Northfield, Deerfield, Everett, Sylvania, Kilburnville and Milwaukee. According to running directions in the Blue Book, this route is a distance of 95 miles as against 89 miles.

Recent Information on Condition of American Highways

THE Touring club of America reports that on the Boston-Quincy-Plymouth shore route the so-called back-river bridge is closed. To avoid this, at Weymouth Heights, turn left at the fountain and follow the road into West Hingham. Through Quincy go via Adams street and Washington street. At Bicknell square the tourist will see a notice of the bridge being closed. Turn to right following trolley line until North Weymouth station is reached. Do not go under railroad but turn to the left and follow the main road straight into West Hingham. From Boston the best route to Rockingham park is through the Fells-way to Reading, Stoneham, Andover, Lawrence. The White mountains from Connecticut and Massachusetts points can be reached over the New West Side boulevard up the Connecticut river valley, will be in excellent condition for use this season.

From Sausalito, Cal., to San Rafael the road is rough in a few places, but as a whole is better than last season. The road is excellent from San Rafael to Santa Rosa, Healdsburg and Cloverdale. What is known as the Blue Slide road, between Cloverdale and Peita, a distance of 7

miles, is rather rough, but can be negotiated nicely at a moderate speed, while the toll road from Pieta to Highland Springs is in fine shape.

The road from Salt Lake City, Utah to Ogden, is fair; Ogden to Brigham, fine; Brigham to Collinston, fine; Collinston to Malad, fine; Malad to summit, 10 miles, trifle rough; summit to Arimo the road is flooded in one or two places; Arimo to McCammon and Pocatello they are fine, with the exception of the canon; Pocatello to Idaho Falls in almost perfect condition. This is a distance of 225 miles and part of the main highway to Yellowstone.

The Buffalo Automobile Club has recently issued a bulletin giving road conditions in its territory. With the exception of 1,500 feet between Pembroke and East Pembroke, the main road from Buffalo to Batavia is all brick and macadam. This stretch has been almost completed. The road between Batavia and Stafford is under improvement and the work will be in progress all summer. The best way to Rochester is to take the left fork at the east end of Batavia and go through Byron, Bergen and Churchville. Work on

the Buffalo-Niagara Falls boulevard is now in progress. During this season the best way to Niagara Falls is through Delaware avenue to Tonawanda, and along the river road. The road from Buffalo to East Aurora from Seneca street city line is all improved brick and macadam, the only bad stretch is in Seneca street, within the city limits. The route from Buffalo to Lancaster by way of Broadway is all improved brick, with the exception of 1 mile at the Forks where there is a convenient detour which is good in dry weather. The boulevard to Niagara Falls on the Canadian side of the Niagara river is completed from the Bridgeburg line to Niagara Falls with the exception of 2 miles at Black Creek. This unimproved portion will probably be completed by mid-summer.

The Interstate trail between St. Joseph, Mo., and Kansas City is in ideal condition with the exception of a short stretch of rough road south of Smithville.

The roads through Nebraska on the Omaha-Denver transcontinental route are reported excellent, and, although the Iowa river-to-river road was found good, it had to take second place.

About Synchronous Coils

Meaning of the Term Explained—Misfiring Probably Due to Air Leak or Weak Magneto

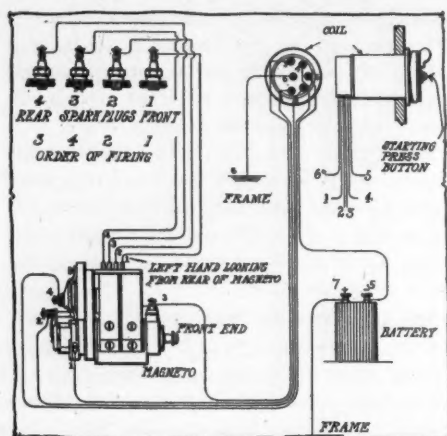


FIG. 1—BOSCH DUAL SYSTEM

LANSING, Mich.—Editor Motor Age—1—Please explain the theory and practice of cranking on the magneto by advancing the spark; it is necessary to advance it, and how far?

2—We use the Bosch dual magneto with a synchronous coil. What does synchronous coil mean?

3—Is there any way to start the engine entirely exclusive of the coil, and if so, how; and what wires should be detached, etc?

4—Why should the engine miss on one cylinder when it is pulling on high gear at speeds below about 15 miles per hour, and not at high speeds?—R. H. J.

1—The electrical impulse generated at each half revolution of a magneto armature is theoretically indicated by a wave. The peak or top of this wave represents the current at its maximum strength and the circuit-breaker of the magneto is timed to break contact somewhere about the peak of this wave. Now, the timing range of a magneto is from a point about midway to the top of this wave, to the top of it. The retard position causing the contact to be broken at a point farthest from the crest of the wave, hence the strength of the spark generated at this time is far inferior to that of the spark which occurs when the contact is broken at the crest of the wave or when the current impulse is at a maximum.

It is for this reason that the spark lever is advanced in cranking a motor, the object being to break the contact of the circuit-breaker while the maximum current is being generated. Thus the higher the spark is advanced the hotter and stronger will be the spark produced at the plug. As for the amount of advance to give the spark lever, all depends upon the timing of the magneto and consequently this is liable to vary on different motors. To learn this point one should start by advancing the lever about one-half way, then perhaps three-quarters of the way, always

The Readers'

Splitdorf Magneto Action Described—Reader Puzzled by Circuits in Ignition Device—Theory of Spark Advance—Advantage of Long-Stroke Motor

being careful while cranking to do so in a manner that will prevent personal injury in case of a backfire.

2—A synchronous coil is one which produces a spark for each cylinder at the same time relative to the piston's position in the cylinder. It is claimed that when a series of different coil units are employed for the ignition of several cylinders with a separate vibrator for each coil it is impossible to adjust them so that the sparks generated will be capable of igniting the charge in each cylinder at the same time. And it is by means of a single coil or vibrator that simultaneous or synchronous ignition is obtained.

3—In the Bosch dual magneto system you may start a motor exclusive of the coil by making a connection with a heavily insulated wire between the terminal No. 3—Fig. 1—at front of the magneto and terminal No. 4 in the center of the distributor at the back end of the mechanism. All other wires should be disconnected from the magneto.

4—The misfiring at low engine speeds may be due to an air leak around the spark plugs, the cylinder plugs, the inlet manifold connections and at any other point where air might be admitted into the gaseous mixture. It also might be due to weak magnets, or it is possible that the points of the spark plugs are too far apart, requiring more current to make a spark jump across them than the magneto is capable of generating at low speeds. This, however, is hardly the cause because a motor even with unusually large spark gaps in the plugs will run steadily at speeds high enough to drive a car 15 miles an hour; a jerky action at from 6 to 7 miles an hour, however, is not unusual from this source. If you will see that there are no air leaks be sure that the compression is good and equally good on all cylinders, then look to the spark plug points you may get rid of this trouble.

PRINCIPLES OF SPLITDORF MAGNETO

Buffalo, Minn.—Editor Motor Age—An article on the Splitdorf magneto in February 22 issue of Motor Age, page 26, in answer to W. Turton of Vienna, Ga., is not quite clear to me.

In speaking of Fig 3, Motor Age says, "To trace the current, the points of the circuit-breaker have just separated, breaking the flow of current through the primary winding of the coil," etc. It seems as if this could not be the case as no

current has been going through this circuit at this particular time. It seems to me that when the points are together the current flows from the armature to the switch and from the switch back on No. 2 wire to ground, which we will call circuit No. 1, and then when the points separate that circuit is broken and then a circuit is established in circuit No. 2, as we will call it; that is, from the armature down the dotted lines as indicated in switch to the primary wire and coil and through coil to ground. Then we get the induced current when the circuit is established and the other circuit, or circuit No. 1, is broken. Then, according to this way of reasoning, when the magneto is supplying the current we get the high tension flux when the core of the coil is magnetized. And when the battery is used as a source of current we get the flux when the core is demagnetized. Am I right?—P. G. L.

To further elucidate the answer given inquiry above referred to, herewith is a brief description of the fundamental actions that take place in the Splitdorf magneto system, wired as per the diagram, Fig. 1a.

The opening of the low-resistance path across the circuit-breaker allows a sudden rush of current to the condenser and primary winding of the coil, which begins to oscillate and continues to oscillate until the vibrations die out from the effects of

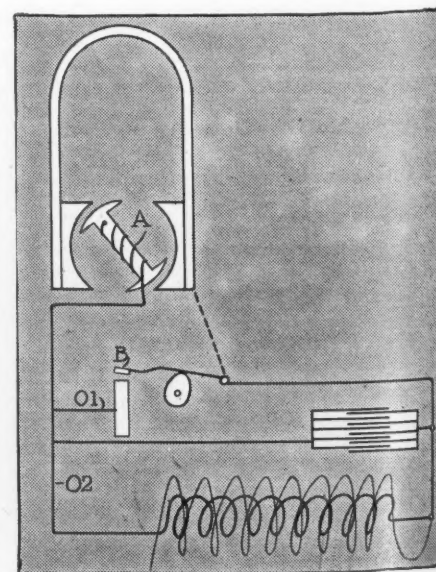


FIG. 1a—THEORETICAL SPLITDORF CIRCUIT

Clearing House



Reader Wants to Convert Car Into Tent for Cross-Country Touring—Flow of Current in Low-Tension Magneto—Improper Cooling of Motor



the dampening. The passage of the oscillatory current through the coils of the primary winding of the coil naturally produces rapid reversals of the magnetic lines in the iron wire core, which by induction create a rapidly alternating difference of potential between the ends of the secondary winding to which the spark plug is attached. If the difference of potential is great enough to overcome the spark plug gap, a spark, or usually a number of successive sparks, jump the gap.

If we simplify the wiring of Fig. 3 of the Readers' Clearing House of that issue, to the essential wiring scheme of the magneto and coil we obtain a diagram as per Fig. 4. From this diagram it is evident that the transformer coil with its condenser and closely coupled primary and secondary windings constitute circuits containing inductance L , mutual inductance M , capacity C and resistance R , and since in this instance the condition in such that $R^2 < 4L/C$, the current flowing in the circuits is oscillatory and highly damped, owing chiefly to the iron core.

If suitable oscillographs are connected into the primary circuit at the points 01 and 02—thus inserting one oscillograph in series with the shorting circuit-breaker, and the other in series with the condenser and primary of the transformer coil it is found that not only do the oscillatory currents surge back and forth through the primary of the transformer, but numerous oscillations take place also between the platinum points of the breaker. It also is evident from the diagram that the separa-

tion of the platinum points in this system does not interrupt the primary current delivered by the magneto to the primary coil, nor does the opening of the circuit-breaker.

Current, even of small intensity, flowing through the great number of turns composing the secondary produces a considerable magnetizing force which acts upon the magnetizing core of the coil and tends to maintain the magnetism in the core so long as the current flows. Since the magnetic flux in the core ceases to vary, the E. M. F. across the little arc between the spark plug falls and the arc ruptures, causing a momentary cessation of current in the secondary, which permits the flux in the core to change and the E. M. F., electro-motive-force, of the secondary to build up—frequently for a number of times—sufficiently to jump the spark plug gap.

MAKES TOURING TENT

Indianapolis, Ind.—Editor Motor Age—Is there a camping outfit on the market which can be carried conveniently on the car in touring without either spoiling its appearance on the way or discommoding the passengers? It should transform the car into a tent.—C. F. H.

Yes, there is at least one outfit of the kind you desire. The tent portion rolls up along the top like side curtains and when let down forms the side of the tent, the top of the car itself making the roof of the tent. The appearance of the car ready for camp and road is shown in Fig. 2. The outfit is called the Quapaw touring tent and is made by Durand Whipple, Little Rock, Ark.

Causes of Overheating

Several Things Aside from Cooling System May be at Fault
—Cleaning the Radiator

MT. CARMEL, Ill.—Editor Motor Age—I have a Regal 30 and for 6 months it has given me no end of trouble. I start it up and cannot run half a mile until it gets so hot one cannot touch the engine with the hand. The water seems to circulate. All hose connections have been removed. The radiator has been flushed out several times and yet it gets hot. It pulls good until it gets hot. The motor starts easy and runs well. Could the trouble be in the gears of the camshaft? Could it have jumped a tooth, or be worn so that the valves are late?—J. G. Ingersoll.

There are several things aside from the cooling system that may account for the overheating. Too light a grade of oil would cause this effect. If the oil you are using is such that it becomes extremely thin when subject to heat, it is possible that it has not sufficient body to furnish proper lubrication, with the result that the friction becomes excessive and overheating takes place. Perhaps the oil is not being fed to the engine in sufficient quantities. It might be advisable to try a slightly heavier and better grade of oil. It also is possible that you are using too rich a mixture and adjustment of the carburetor would eliminate trouble.

It may be that the inside of the water-jacket and radiator are incrustated with sediment enough to prevent the heat from being carried away from the cylinders by the water or from the water by the air, yet not be sufficient to affect the rate of circulation noticeably. If this is the case, the cooling surfaces can be cleaned by using a solution of crystals of soda in the proportions of 2 pounds of soda to 1 gallon of water. Put this solution in the radiator, run the motor a few minutes and let stand over night, then flush out thoroughly with clear water.



FIG. 2—CAR EQUIPPED WITH TOURING TENT ON THE ROAD AND IN CAMP

Surface of Radiator

Method of Finding Proper Size and Design by Test in One Factory Illustrated

LANSING, Mich., Editor Motor Age—Inform me how the amount of radiation surface is figured with a cellular or honeycomb radiator on a four-cylinder car with 5-inch bore and 6-inch stroke.—R. H. J.

There is no formula for finding the cooling radiator surface necessary for any four-cylinder motor that is applicable to all types and makes of radiators. This is because of the great variation in the cooling efficiency of the various designs of motors and radiators made. Each radiator maker, however, will be able to very closely approximate the amount of surface of its own design most suitable for any particular motor. In Fig. 3 the means employed by the Briscoe Mfg. Co. for determining the efficiency of its radiators is illustrated; and the following descriptions and data given out to designers by this company should give you an idea of the methods employed in choosing the proper sized radiator for a given motor.

Referring to the sketch, an inclosed hood is fitted at its rear with a disk fan. At its front is an arrangement of shutters whereby the opening can be changed to any size or shape. A radiator is placed in this opening, and the shutters are closed so that all the air drawn through by the fan can pass through the radiator. Above stands a hot water tank, with pipes entering it carrying hot water, cold water and steam. These are so regulated that this tank is kept full of water at an even temperature, generally 100 to 200 degrees Fahrenheit. From this tank a pipe runs down to the radiator inlet with a thermometer. The outlet pipe for the radiator also has in it a thermometer and a valve for regulating the flow. The cooled water escapes into the top, which stands on a scale.

Hot water is passed through the radiator at a uniform rate and weighed every $2\frac{1}{2}$ minutes for verification. The fan is run at a uniform rate, and the fan speed is taken every $2\frac{1}{2}$ minutes as a check. Every $2\frac{1}{2}$ minutes both inlet and outlet thermometers are read and the temperature of the surrounding air is taken. The test usually runs for 20 or 30 minutes, and the readings are averaged. By referring to the following tables showing the specific heat of water entering the radiator is found, and also the heat units in the same quantity at the temperature it leaves the radiator. The difference shows the number of heat units dissipated from this quantity of water during the test.

HINT TO FORD OWNERS

Port Townsend, Wash.—Editor Motor Age—In order to stop grease from coming out of the rear axle housing on to the wheels, the Ford Motor Co. recommends the

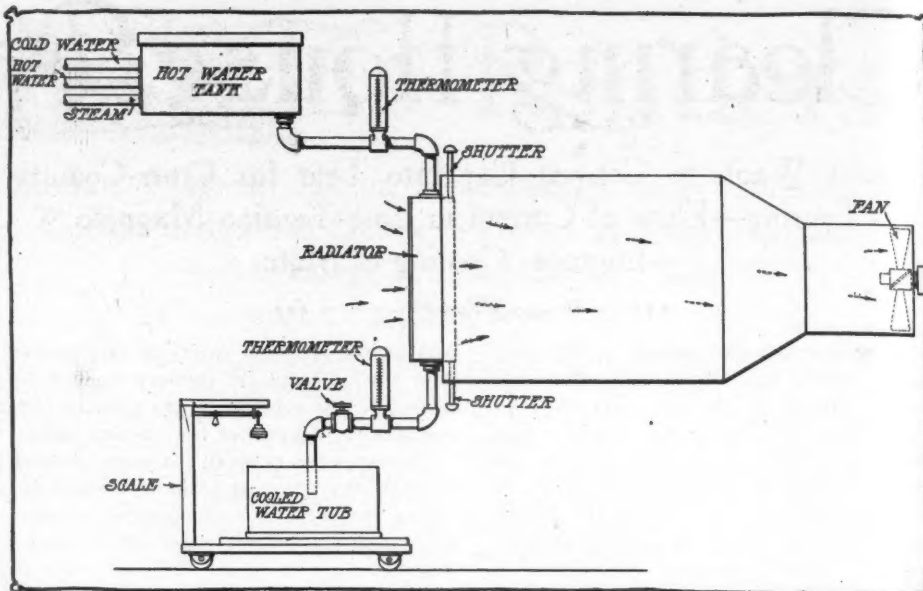


FIG. 3—APPARATUS FOR TESTING EFFICIENCY

following: Remove the wheel and the outer roller bearing and with a long rod force waste into the housing as far as it can be pushed in. Use $\frac{3}{4}$ or 1 pound of waste. This method has worked out more satisfactorily than any other thing the company has tried.—W. H. Wilcox.

SPLITDORF DUAL SYSTEM

Albany, N. Y.—Editor Motor Age—In looking over a February issue of Motor Age I noticed a wiring diagram of the Splitdorf dual system, in which the battery circuit was clear to me, but I do not understand the circuit from the magneto. Will Motor Age kindly give me a little more detail on this.—Reader.

More detailed information regarding the Splitdorf dual system is to be found on page 30 of this issue.

LONG STROKE AGAIN

Chicago—Editor Motor Age—What are the advantages claimed for the long-stroke motor, and why?—J. B. D.

The views of two engineers are quoted in part below and will show how many designers regard the long stroke.

"In considering the relation of bore to stroke in a motor car gas engine," states Julius B. Entz, in a paper read before the S. A. E., "we may assume that at 1,000 revolutions per minute the power obtained will be proportional to the piston displacement, and that a $4\frac{1}{2}$ by $4\frac{1}{2}$ and a 4 by $5\frac{1}{4}$ will give equal power. If each engine is designed for the same percentage of compression space, and has valves proportional in size to the bore, we find that the shorter stroke engine has a total pressure on its piston head of $5\frac{1}{4}$ divided by $4\frac{1}{2}$, or 26 per cent more than the longer stroke engine, and that as the crankshaft and connecting-rod bearings turn but once in their boxes per revolution, whether the stroke be long or short, that the loss in them is increased.

"The side pressure of the piston on the cylinder walls also is greater in the same

proportion, but as the piston speed is correspondingly less, the loss will be about the same in each. But the result is a higher mechanical efficiency for the long stroke. The piston in the long-stroke is lighter, being less in head and walls, but the speed being higher the balance of the two engines at the same revolutions per minute will probably not differ much.

"The wall area of the compression space is less in the long stroke, and its thermal efficiency is higher therefore, as well as its mechanical efficiency. The torque of the long-stroke is higher at low speeds, due to its higher thermal efficiency which is lowest at low speeds.

"At high speeds, however, as the same volume must be drawn through smaller valves, the long stroke will have a less volumetric efficiency, if the valves are small enough to be the limiting factor, and therefore will lose power at high speeds. But in practice even in engines of 40 per cent longer stroke than bore, the carburetor generally determines the volumetric efficiency rather than the valves.

"It is, of course, a question as to how much the stroke can be increased as compared with the bore and give better results, but I believe that engines with a stroke relation to bore of from 1.4 to 1.5 are lighter, more efficient, and more flexible than shorter stroke engines."

According to E. A. Myers of the Model Gas Engine Works, in a paper on the advantages of long-stroke read before the Society of Automobile Engineers in January, 1911, briefly, he says that the advantages of a long-stroke motor over a short-stroke are:

- 1—A motor much lighter in weight for a given horsepower.
- 2—A motor of longer life.
- 3—A motor more economical in the use of fuel.
- 4—A motor requiring less radiating surface for cooling.

5—A motor of smoother running qualities and less noise.

"It seems to be the prevailing opinion that the longer stroke motor is of heavier design," says Mr. Myers. "Our entire experience has been exactly the opposite. For an illustration, take a 4 by 4 motor of modern construction. It is a bad design, indeed, if any good designer cannot copy it, changing it to a 4 by 5½, making a motor of as long life at an increased weight of from 5 to 10 per cent. In making the change he will get an increase in power of from 25 to 35 per cent. at the same number of revolutions per minute. He will not have increased the initial pressure on the piston head, the shock caused by the instantaneous expansion of the gases at the beginning of the stroke, or the pressure on the bearings. Hence there is no occasion for increasing the thickness of the piston head, cylinder walls or other parts.

"The long-stroke motor of a given horsepower has a smaller cylinder diameter, and, as the initial pressure on the piston head is practically the same in both long and short-stroke construction, if there is no difference in the diameter of the cylinders, it is clear that the actual pressure on the piston head of the motor of smaller diameter and longer stroke will be less than in that of larger diameter and shorter stroke, and as a natural result the shock caused by the quick expansion of the gases at the beginning of the stroke is less in the smaller diameter; the work on the bearings being not so severe. In the short-stroke motor practically all parts, with the exception of the piston, must move faster. This, together with the number of reversals of direction of motion per unit of time, must necessarily mean more wear on the bearings, valves, valve-stems and cams. It is well under-

stood that the intake valve does not require the attention in the way of regrinding the exhaust valve does; the heat of the escaping gases being responsible for the difference. If we can reduce the temperature of the burnt gases as they are permitted to escape through the exhaust valve, which is accomplished with the long-stroke motor, we thereby reduce the cause for regrinding to just that extent.

CUTTING OUT THE MUFFLER

Lansing, Mich.—Editor Motor Age—Will Motor Age inform me if more power is actually obtained by cutting out the muffler?—R. H. J.

It is a well-known fact that with many cars now in use considerably more power can be obtained by cutting out the muffler, especially when it is choked with soot. However, in first-class condition but little power is lost as the result of back pressure in the exhaust system except at very high speeds. In Fig. 4 a diagram showing the power absorbed by a muffler is reproduced. This diagram was plotted from results obtained in testing the mufflers employed on Rambler cars a few years ago.

It will be noted that only at the very highest speeds does the muffler call for any effort on the part of the engine. Owing to the misuse of the cutout by many motor car drivers there now are movements on foot in many cities to pass ordinances prohibiting the use of the muffler cutout; and in order to meet these conditions manufacturers have striven to increase the efficiency of the muffler to such an extent that the cutout is unnecessary. The use of the muffler cutout as a warning signal, though generally most effective, is exceedingly harsh and annoying to the majority of persons in the immediate vicinity of a car whose driver is employing it for this purpose.

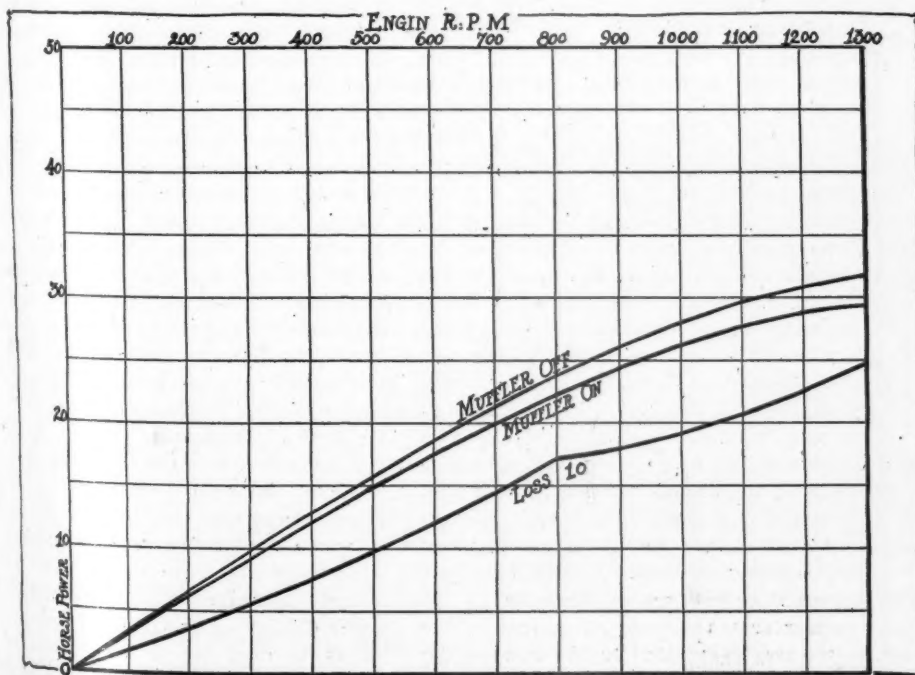


FIG. 4—CURVE SHOWING LOSS OF POWER DUE TO MUFFLER

Accessibility Needed

Reader Takes Up Cudgels for Better Arrangement of Nut and Bolts

SAUK CENTER, Minn.—Editor Motor Age—If there is anything about a motor car which needs improving it is the manner in which the various makers put their cars together. Take, for instance, the cap screws which hold the cylinder heads on the crankcase. Nearly always they are placed in the most awkward position to get at with any kind of either socket or ratchet wrench, and then, if you can get at them, you every time find that not one in a dozen will permit of the socket covering the head of the nut or cap screw on account of the hole for it being drilled too close to the barrel of the cylinder, making it almost impossible to get the screw out without resort to a punch or cold chisel to mar and spoil the nut or screw. This is not good mechanical practice and can be avoided easily by the mechanical engineers in designing and at no additional cost whatever to the manufacturer.

Just a day or so ago I was helping a friend fix one part of the car and was surprised to see the plain evidence on the cap screw head of the use of a cold chisel in tightening up this screw—and done by the assembler, too! How do you think, Mr. Mechanical Engineer, if your socket wrenches will not take hold of certain bolts, nuts and screws, and you use a cold chisel to do the work, that we users can do any differently? I have nearly all styles of wrenches—socket, universal, joint, etc.,—and still there are many places that not one of them will do business on the job.

It would not be quite as provoking if the designers would make allowance for the thickness of the sockets so as to turn them around after they could be gotten on the nut or screw, but I have been bothered in this to a very great extent. I could at times get the socket on the nut and then find the space was too small to turn the nut or screw and had to resort to the unmechanical way of taking a cold chisel or punch and pecking away in a cramped position to do what could be easily done if the maker had done what he should when building the car. It seems that as if they thought it was to be put together only and never taken apart, and that any way a drill and threading machine could get at the job was good enough for any one.

It used to be just the same with gas engine building until of late the makers are looking into this ease of repair feature and making many sales on the argument of how easy you can, in case of breakage, take apart the engine and repair it. But still, I have noticed, some old-timer still clings to the awkward way of getting at the various parts of his engine, and the unbusiness-like man is losing money daily.—A. D. Carpenter.

Telephones of the Car

Electric Horn Medium of Communication Between the Motorist and the General Public—Description of Process of Manufacture of the Klaxon

THE electric horn is the telephone of the motor car. As the rapidly vibrating diaphragm of the telephone makes and breaks the electric current in the wires and transmits its messages afar, so in the electric horn the diaphragm by its rapid vibration creates its loud tones which are sent forward along the country road or the city street as a warning of approach. In the telephone, the diaphragm which makes the sound is set in vibration by the human voice. With every change in pitch there is an increase or decrease in vibration and difference in sound, so that every change is reproduced at the other end of the line, miles and perhaps thousands of miles away. In the electric horn, a diaphragm must be vibrated; there is no human voice to set it in motion, consequently mechanical means are sought. In one type of horn a small electric motor is used, and in another type electro-magnetic means is employed.

Diaphragm Much Used

The use of the diaphragm in the motor car field is not new. It has found a place in the design of many car parts, but never before for sound purposes. In the early Krebs carbureters, a leather or rubber diaphragm was used to control the entrance of auxiliary air. In the final White steam car, a diaphragm regulated the water flow to the steam generator, and in the present Packard carburetor system a diaphragm is used as a part of the hydraulic governor.

When the electric horn problem first presented itself, the use of the vibrating diaphragm was a natural step. All sound is vibration. Scientists define sound as vibrations that may be appreciated by the ear. The piano, the violin, the guitar and scores of other instruments give forth sounds due to the vibrations of strings. Varying the lengths of these strings produces different notes. In the massive pipe organ of the church and the concert hall, sound consists in the vibrations of columns of air within pipes of different diameters and different lengths. The bell in any church steeple is set in vibration by the hammer or tongue; the vibrations in the metal are transmitted to the surrounding air, and these air waves are transmitted to the drum or diaphragm of the human

ear. They are received and interpreted by the brain. This is sound.

So through the entire field of sound. It is all vibration in one form or another.

How does the Klaxon horn produce vibrations? Fig. 1 explains this. The vanadium steel diaphragm A does it. This diaphragm has to be vibrated. The electric motor does this, but between the motor and the diaphragm is an essential part, a form of toothed wheel C which is mounted on the motor shaft. When the motor revolves, it revolves. Each tooth strikes the button B on the diaphragm and causes a vibration. A diaphragm, a wheel, and a motor, with, of course, the necessary metal casings to hold them together, and the bell-shaped mouthpiece—this is all there is to the Klaxon horn. The Klaxon and the Klaxonet are alike in principle, but they differ in details of construction.

The Klaxon rotor C has ten teeth; the Klaxonet fifteen. The disk of the former, therefore, vibrates at the rate of 30,000 times a minute, while that of the latter, 45,000 times, since the motor in either runs at 3,000 revolutions a minute. The sound waves which are produced by this exceedingly rapid vibration are the result of careful experimentation and they have a harsh, startling quality for effectively giving warning of the approach of a car. The tone of the Klaxonet is shriller, about one-half as loud and not so sharp.

The motor is housed in a case, its two poles being part of the inner side of this shell. The armature shaft D is prolonged, and the toothed rotor C is keyed to its upper end. When the current is turned on by closing the circuit through a switch, the armature is revolved, and the teeth of the rotor strike against the button B which is riveted in the center of the disk A, thus rapidly vibrating the latter and producing the series of sound waves.

Features of Diaphragm

The diaphragm is rigidly fastened to the frame of the horn by the screws shown. These screws also pass through the flange to which the projector is fastened, thus bolting the latter to the housing which incloses the rotor and the armature shaft.

The diaphragm or vibrating disk A, 5½ inches in diameter, is constructed of a tough chrome vanadium steel. The face of the button or anvil B against which

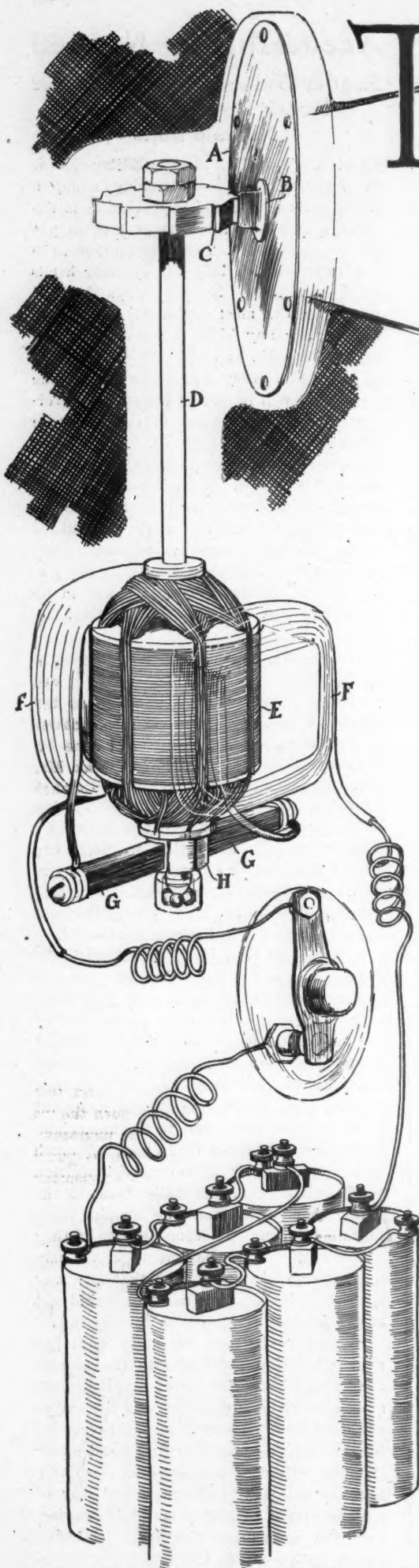


Fig. 1—Showing component parts of Klaxon horn



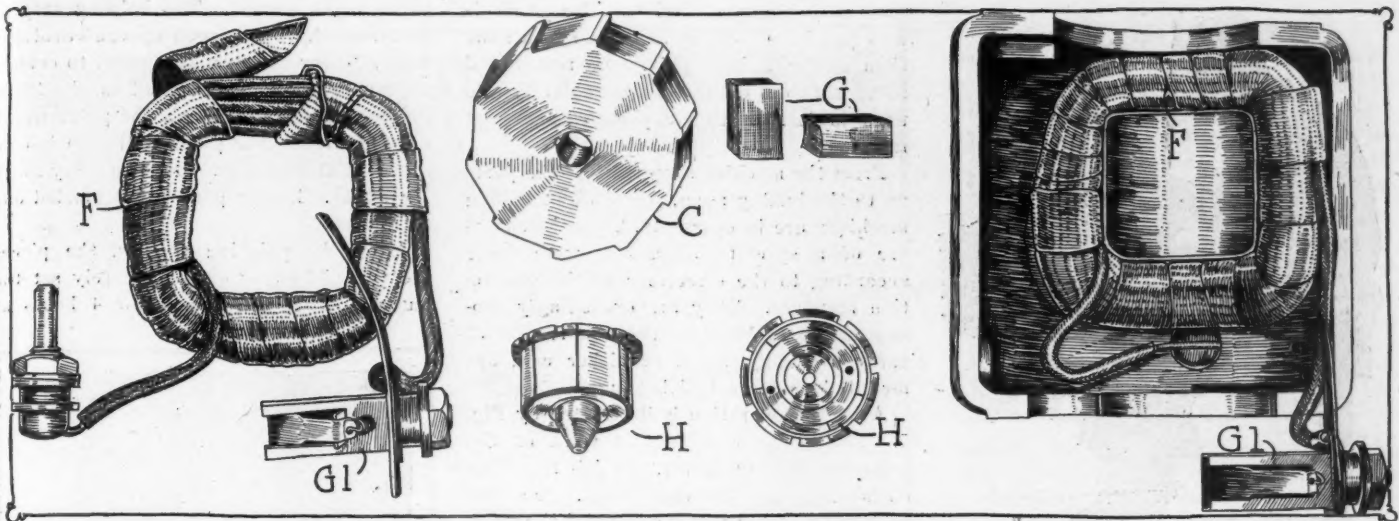


FIG. 2—MANY PARTS ENTERING INTO THE KLAXON ELECTRIC MOTOR

F shows the two field windings which are held one in each side of the motor housing as shown in the right of the illustration. The armature is shown at H in two places. G is the copper gauze brush and G1 is the brush holder

the hardened toothed wheel C strikes is made glass-hard to withstand the wear to which it is subjected.

Since the motor must operate with the least friction possible on account of the low available voltage, its designers have constructed it with the idea of eliminating frictional resistance wherever possible. The lower bearing is a small ball-thrust type, the accurately beveled end of the armature shaft H resting in the cup on the balls. Above the armature there is an accurately-finished plain bearing which is provided with an oil groove for properly distributing the oil over the bearing surface.

For adjusting the position of the rotor teeth with respect to the anvil, the upper bearing is drilled eccentrically, so that the whole motor and its case can be turned until the motor is nearer to or farther from the anvil.

The Horn Factory

In a journey through the factory of the Lovell-McConnell Mfg. Co., Newark, N. J., where these horns are made, the first great impression is that it is not a horn factory, but an electric motor factory. The majority of the workmen are busied in some stage or other of the motor's manufacture. It is the delicate portion and the one requiring most labor, and while the diaphragm is delicate also, yet its manufacture is a simple matter as compared with the making of the motor.

Some are suggesting, why not buy the motor? This was thought of at the start, but found impractical. The work for which it is intended is a special one; even the shape is characteristic. Low current consumption was deemed imperative and this required an improvement in the motor over the standard market type.

While the motor is small and is designed to operate on 6 to 8 volts, there is nothing of the toy about it. Its construction follows closely along the lines of the large railway motors. There is a laminated arm-

ature E made up of forty-two disks and shown at G, Fig. 1. The brushes G, Fig. 2, are made of copper gauze which is impregnated with non-fluid oil and pressed into the proper shape. Springs are arranged in the brush holders so wear of the brushes is taken up automatically. No attention to the brushes is necessary therefore since their construction makes them self-lubricating. It is seen, therefore, that the Klaxon is strictly an apparatus for the manufacture of a sharp, warning noise—a noise machine.

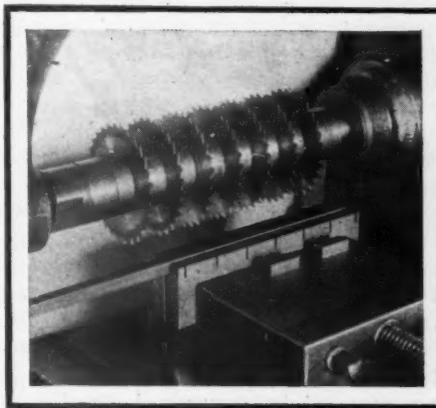


Fig. 3—Cutting the brush-holders six at a time. It takes 5 seconds to cut off six of these. Each brush holder is a very short length of square-section tubing, two of these lengths being shown directly in front of where the cutting operation is being done

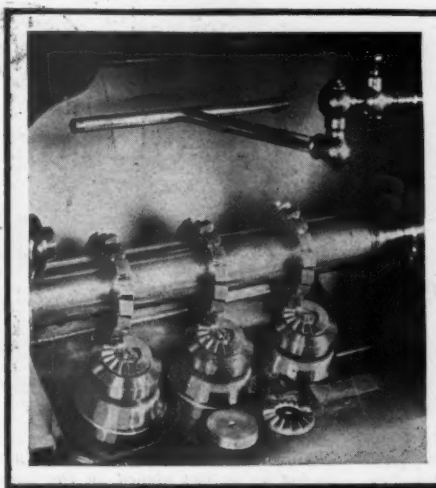


Fig. 4—Making the teeth on the rotors for Klaxonets. Five minutes are required to completely mill three rotors as here illustrated. Blank and completed wheel in the foreground

The plant turns out 200 of these signal devices each day, fully 80 per cent of the 160 employees being concerned in their progression from the raw materials to complete signals. All the component parts are manufactured in their entirety except the projectors. The factory is fairly bristling with labor-saving schemes, scientific management and ideas for the welfare of the workmen. No step has been left out in the building of an ultra-modern organization.

The manufacture may be said to start with the foundry in which all the metal parts, such as the rotor and armature shaft housing, the motor case, the bottom plate and the upper bearing and sleeve, are cast from a yellow brass alloy. This metal is melted in crucibles which are heated by gas. The fumes from these small furnaces are conveyed away by a large hood, which extends across one entire end of the foundry above the melting pots.

The molds are made by hand-molding machines of the type in general use. Such pieces as the rotor housing and the motor case are cast four to each flask.

Standard Foundry Practice

No special interest attaches to the foundry, as the processes which are carried on there do not differ from those to be seen on any well-operated casting floor. After the molds have been made, the flasks are ranged along the floor in long lines, and the metal poured into them through the pore-holes made by the sprues. The ladles from which the metal is poured



Fig. 5—In the buffing room. It takes the workman 55 seconds to completely polish the projector as shown here

are filled from the crucibles and they are each carried by two men. Since the castings are small, the use of hand-operated ladles is the best practice. If the parts were large and required a considerable amount of molten metal, an overhead conveyor for carrying the ladles would be necessitated, as the weight then would be excessive for hand operation. Such matters as this were carefully considered by the head of the production department before the system of operation now used was finally decided upon.

From the foundry, the finished castings are conveyed to the stock room and from here they go eventually to the various machine tools for machining and finishing.

In the machine shop the aim has been to reduce unproductive time to a minimum. The machine tools all have been arranged with the view of making them as convenient to the workmen as possible, a big item in efficiency.

Much Machinery Used

The castings and the blanks for parts not cast, such as the armature shaft and the laminations, are machined and brought down to their final forms in the usual way. Turret lathes, screw machines, milling machines, drills, punches and shapers all play their part in the manufacturing cycle. Jigs are used extensively in connection with the multiple-spindle drills in making the holes in such pieces as the projector flanges and the mating flanges of the rotor and armature shaft housings. The use of jigs insures that the parts are in exact duplicate.

Several of the parts are made a number at a time on a single machine, as shown by Fig. 4. This illustrates the making of the teeth on Klaxonet rotors. Three toothed cutters are rigged up on the same shaft, and it requires 5 minutes to completely mill three rotors simultaneously, each of which has fifteen teeth. In the foreground a blank and a completed rotor are shown.

The cutting of the brush-holders also is

done at wholesale, Fig. 3. The stock is first put in the clamp and the seven saws then brought into play. It requires 5 seconds to cut off six of these pieces. No time is lost in this department, at any rate.

From the machine shop most of the parts go to the buffing room, where eight buffing machines are in operation. These machines are of a special design and were made according to the directions of the production manager. They are exceedingly economical of power, since their shafts, which carry a buffing wheel at either end, are mounted on large ball bearings.

A buffing operation is illustrated by Fig. 5. The operator is seen at work on the polishing of a projector, the job requiring 55 seconds for its completion. To buff such parts as the motor cases and the rotor housings requires about 20 seconds on the average.

Spraying the Enamel

Ninety per cent of the signals manufactured by the firm is enameled black. The other 10 per cent is turned out of polished brass and polished nickel-plated brass. It is evident therefore that methods for quickly and effectively lacquering the enameled parts are necessary. The large pieces to be painted are first rubbed with lime for the purpose of removing all the grease which has collected on them in the machine shop and buffing room. This is necessary since the paint would not hold to them were it put on over a film of grease or oil. Lime acts as an absorbent and polisher as well. Very small pieces such as screws and nuts are not subjected to this treatment, since their surfaces are too small to collect much grease or dirt.

The parts are not dipped, but are coated by means of atomizers or sprayers which are operated by compressed air, Fig. 6. In this illustration, a number of machine screws are shown in the process of having

their heads coated. The holding tray is first loaded, then placed on the revolving table. Thirty seconds is required to enamel such a tray-load. The hood in the background serves to catch all the paint which does not reach the pieces. It also is connected with a suction blower to carry away the fumes. Larger parts are enameled one at a time.

After the painting process, the pieces are placed in ovens to completely set the enamel. They are baked for 4 hours at



Fig. 6—Enameling head of screws at wholesale. The holding tray is first loaded, then placed on the revolving table. The enamel is then sprayed onto the pieces in half a minute. After being coated the screws are put in the oven and baked at 280 degrees for 4 hours to thoroughly dry the enamel. All enameled parts are treated in the same way

a temperature of 280 degrees. While this painting process is not so economical of paint, the saving in time over any other process greatly outweighs the consideration of the amount of paint used.

The vibrating disks are an important part of the Klaxon construction and they must not be overlooked here. They are constructed of a tough grade of chrome vanadium steel. To be of use in the signals, they must be absolutely flat and stiff. The operators who do this work have become very adept at their particular occupations. The disks come to these men

without the anvils in their centers, and not trued up. They are placed on metal blocks and hammered lightly wherever the straight edge shows even the slightest hollow to exist until they are perfectly flat, and no light shows between them

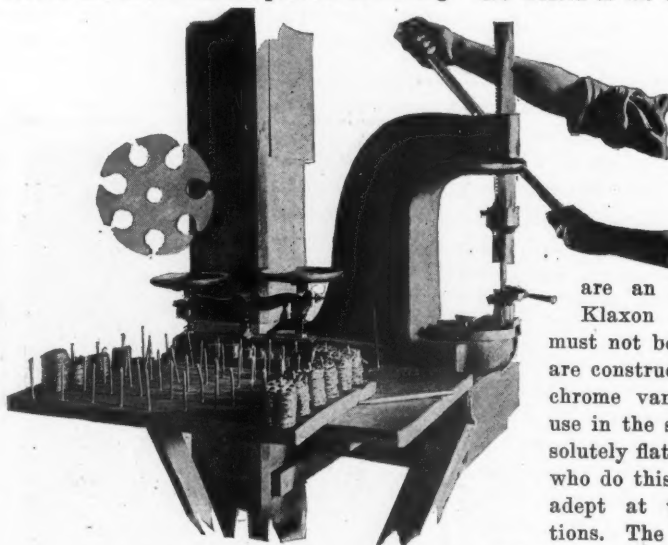


Fig. 7—Making the armature. The laminations are counted by weight placed on the form and then pressed together by the arbor. The clamp is then applied and holds them down while the arbor is released and the armature shaft pressed down through their center by the arbor. Note shape of lamination in upper left

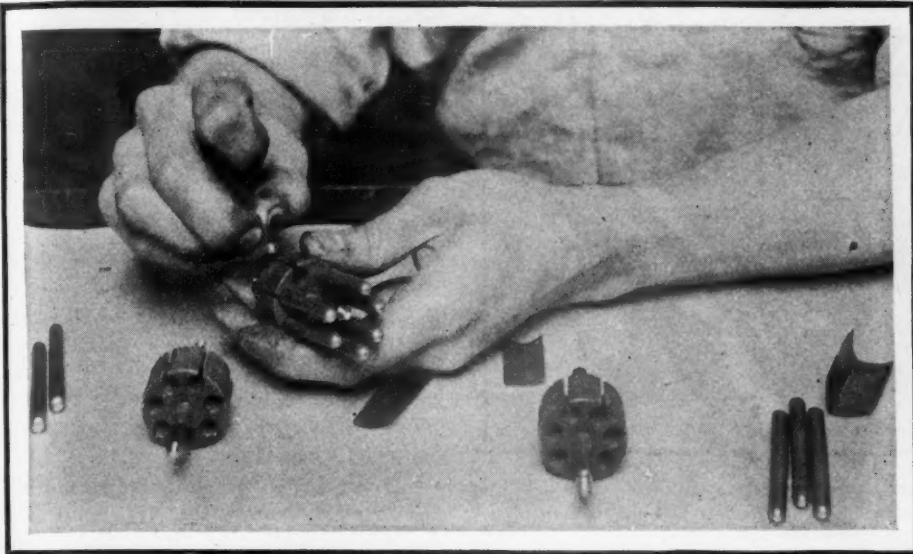


Fig. 8—How the tough brown insulating paper is pasted in the armature slots. The paper is first moistened, then put around one of the metal pins and slipped into the armature slot. The pins are pushed into the slots tightly and allowed to remain for several minutes until the mucilage on the paper has set

and the straight edge. This hammering and truing process is continued on each disk until it meets with the requirements. Some of the disks being originally in worse shape than others they naturally require longer to be leveled.

After the leveling is finished, the small button or anvil is riveted in the center of the disk, this operation taking 40 seconds. The disk then is ready to go to the assembling department.

While these various processes are going on in the different parts of the factory, another department is concerned with making the motors. This is perhaps the most important feature of the whole device, and its construction is carried on with the utmost care. Present practice in commercial motor design has been adhered to strictly in these miniature machines, as has already been pointed out.

Making the Armature

The first step in the making of the motor is the construction of the armature, which is made up of forty-two laminated disks, pressed together as shown by Fig. 7. The laminations, which have been previously punched to form in the machine shop, are counted by weight to save time. The scales for the purpose are seen in the illustration. On one pan the correct number of disks has been placed by actual count. These are used as the standard, and disks are placed on the other pan until the two balance.

These laminations which have been weighed out then are racked up as shown until they are to be put on the arbor press. The rack is simply a board or bench through which a number of large spikes have been driven. After the operator has weighed out a number of sets of these laminations, he places a set of them on the table of the press in the clamp as shown. The slots in the several laminations are made to register with one another by being placed on pins which stick up vertically

from the base of the clamp. This done, the arbor is brought down on the laminations and they are pressed together firmly. While the arbor is still holding them down, the top of the clamp is slipped over them, thus keeping them in their compressed condition while the arbor is released. The



Fig. 9a—Closer view of Fig. 9a. First steps in winding the armature. There are seven coils to each of these

armature shaft is next pressed down through their center, this part of the operation being in progress when the photograph was taken. A stop below the table of the arbor press limits the distance which the shaft may be pressed through the laminations. Since the armature is a force fit, the laminations are held together tightly by contact with it, and the clamp can now be released. In Fig. 10 at 1, this stage in the armature's development is clearly illustrated. The armature is now ready to have its slots covered with the brown insulating paper, as seen in Fig. 10 at 2. Fig. 8 shows the man in the act of putting a piece of paper in the last slot. Steel pins are used to assist in the even covering of the slots. The gummed paper is first

moistened, then placed around the pin and slipped into the slot. Since the pin is tapered, it is shoved tightly into the hole and holds the paper firmly against the sides. The pins are allowed to remain in the slots for several minutes until the glue is dry. The protruding ends of the paper are pasted over the exposed parts of the laminations merely to assist in the winding. These ends are later torn off at the edges of the slots.

Winding the Armature

The winding process is next in order, and it is illustrated by the two views, Figs. 9a and 9b. The latter is a nearer view and shows the beginning of the operation. The holder in which the armature is placed looks very much like a small lathe and it has provision for clamping the shaft tight in any position while any one of the seven coils is being wound. Other pieces of paper are placed at the ends of the slots, as seen at 9b, thus perfectly insulating the wire from the laminated core.

Each of the seven coils which is placed on the core is made up of 8 feet of No. 20 wire, making 56 feet in all. This applies to the 6-volt winding, which is the standard. With so few turns of wire, the process of winding by hand is more economical than machine-winding would be.

After the winding has been completed, the armature looks as shown in Fig. 10, part 3. The terminals are here brought out and are ready for attaching to the commutator.

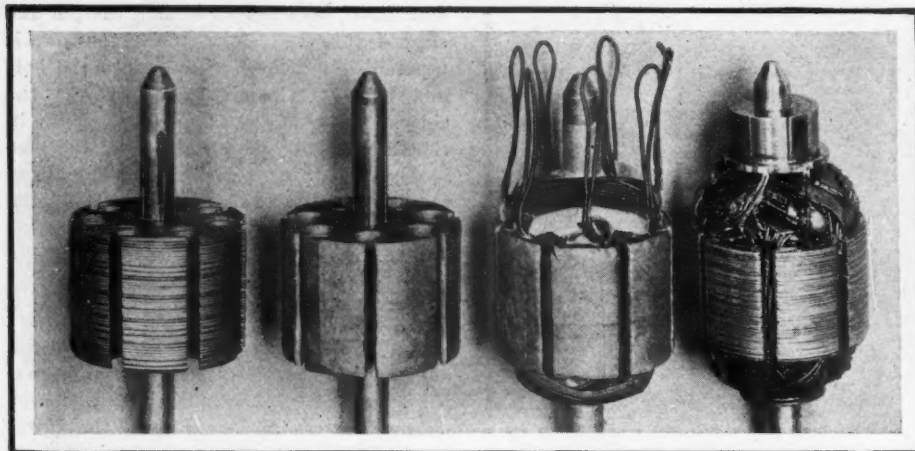
This is the next step, and after the commutator has been forced on the shaft, the winding terminals are bared and soldered in slots of the commutator segments. Now the armature is ready for baking. This is done to drive off the moisture which has been absorbed by the insulation.

After this preliminary baking, it is impregnated with insulating varnish and baked again for 8 hours. Following this heating the brown paper is removed from the faces of the armature segments and the completed part appears as in Fig. 10, part 4.

The commutator, too, is made very care-



Fig. 9a—Armature winding. The shaft is placed in a holder very much like a small lathe. There are seven coils to each armature, and 56 feet of wire in all



PART 1

PART 2

PART 3

PART 4

Fig. 10—Four stages in the making of the armature: 1, The forty-two laminated disks or laminations after being pressed onto shaft. 2, Showing armature ready for winding. The slots have been covered with the heavy insulating paper. 3, Armature after winding. 4, The completed armature ready for assembling in the motor. The commutator has been forced onto the shaft and the windings connected to the commutator pieces and segments. The armature has been dipped in varnish and baked, and the paper which was placed over the armature segments to facilitate winding has been removed, leaving the device in final form

fully. When completed, this part measures only $\frac{3}{4}$ inch in diameter, yet it is composed of twenty-one separate pieces. Two views of it are seen at H, Fig. 2. The seven segments which are made of hard-drawn copper and the mica separators are first set in a ring form, which is large enough in diameter to allow of their slipping into it very easily. Next they are placed in a ring which is somewhat smaller in diameter and finally into one which clamps them very tightly. This last change is done by means of a small press. The variations in the internal diameters of these several rings are very small, several thousandths of an inch at most.

After being forced into the smallest of the three rings, the unfinished commutator is sent to the machine shop, where it is turned down on the inside with a small dovetail. It then goes back to the commutator bench where a metal sleeve is put into it with proper end washers and a spanner nut. The tightening up of this nut clamps the sleeve against the dovetail of the segments and mica pieces and the whole is firmly held together, so that the ring into which it was initially forced can now be removed.

It is again remanded to the machine shop, this time to have the outside turned to proper shape. This operation could not be done before, since when the commutator first visited the machine shop the forming ring covered the outside of the segments. A flange is left on the inner end and slots are cut in it to receive the armature coil ends.

Winding Field Coils

Another interesting process is the winding of the field coils. These appear as at F, Fig. 2, when finished. The winding of the wire of one of them takes the experienced workman 2 minutes. They are made on square forms or blocks, directly from wire stock on a spool.

One operator does nothing but wind the coils, after which they are passed to another

man who covers the leads with braided tubing for insulating purposes. He then winds them with tape, the process requiring about 2 minutes. Then the forming process takes place, the taped coils being bent to a curve, so that they will fit in the motor cases as shown in Fig. 2. The terminals next must be soldered to the coil ends, and finally the varnishing and baking operations are carried out on them, as in the case of the armature. Each armature is thoroughly tested before being put into a motor case.

Motor in Assembly

In assembling the motors, the field coils are first put in place and their terminals attached to the brush-holders. These latter are then screwed in position, after which the brushes and their springs are fastened in. Next the armature is put in position,

the lower end of its shaft resting in the small cup and against the balls. Then the top plate, or the piece which incloses the upper part of the shaft, is slipped on and the long screws which pass from it through the length of the case and screw into the bottom plate are put in place.

The motor is now ready for final testing and attachment to the rotor and shaft housing. This is accomplished by means of the two nuts, which, when set up tight, lock the motor and the upper part in position. The rotor is next put in place and bolted as shown in Fig. 1, the top nut being used as a locknut.

The Final Assembly

The instrument is now ready for final assembly as shown in Fig. 11. There is a composition washer on either side of the vibrating disk, and the workman is seen in the act of placing one of these in position. The final step is simply the screwing together of the projector and its base and the flange of the rotor housing.

The completed signal then goes to the testers and adjusters, who connect it to a source of electrical current and adjust it until the position of the rotor is correct relative to that of the anvil. The correct adjustment is indicated by the quality of the tone, and the men who are employed in this department have become so skilled in this adjusting that several seconds only are required to determine the correct position.

So far as the care of the Klaxon in actual use is concerned, there are only two things to be careful about under ordinary conditions. The first and most important of these is the lubrication. More than 75 per cent of the signals that are sent back to the maker for repairs have been damaged because the owners have neglected the oiling. Once a month the bottom plate must be removed from the horn and the commutator cleaned with gasoline. A light film of vaseline or other hard oil should be applied to the commutator. The result of the neglect of lubrication is a pronounced falling off in the volume of sound. The carbon brushes become glazed and the motor does not run satisfactorily. The first thing to do when trouble develops with a Klaxon is to remove the bottom plate and see if the commutator is dry. Treatment with gasoline and vaseline usually will restore it.

The current consumption of the signal should be watched. If the horn is in good condition, it should draw from 6 to 7.5 amperes at 5.5 volts, while the Klaxonette should take about 2.4 amperes at the same voltage. If either instrument should draw noticeably more current, it is probable that there is a short circuit. If not in the outside wiring, the cause is a short-circuit through several of the windings of the armature, materially cutting down the efficiency. This is shown on the ammeter and should be taken up with the maker of the horn.

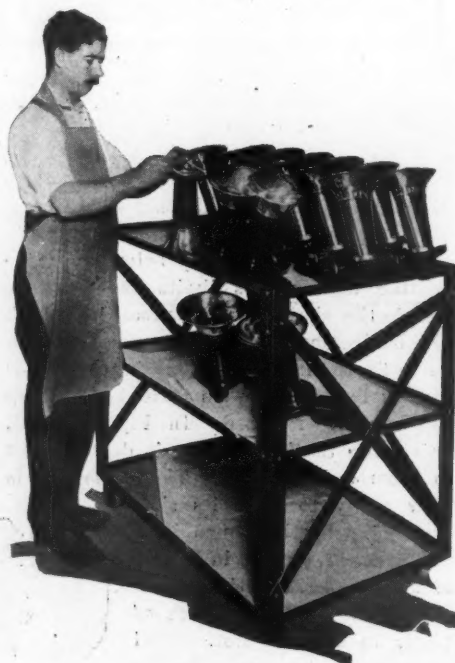


Fig. 11—The final assembling of the Klaxon. Putting the projector diaphragms and disks together



The Motor Car Repair Shop

Hints on the Care of the Hands—Negotiating Slippery Pavement—Advancing the Spark—Electrolyte

MUCH trouble and pain could be saved the repairman if proper attention were given the hands, and some of the most common methods of cleansing them avoided. If, before tackling a specially dirty job, the crevices of the hands were filled with a good toilet soap there would be little trouble in removing the dirt when the job is finished, and the skin would remain soft and smooth. A coarse, hard skin is much harder to keep clean than a smooth, fine one, and the use of strong alkaline soaps and gasoline tends to make the skin rough and scaly.

Most repairmen use soft soap and gasoline because it can be obtained free of charge, and this is, of course, a strong argument in its favor, but a handful of sawdust saturated with kerosene will be found just as cheap, more effective and less detrimental to the skin. In operations where acid is used, such as in soldering with zinc chloride as a flux, it is advisable to wear gloves, the soft cotton kind, which may be purchased for 5 or 10 cents in almost any dry goods or furnishing store being most practicable. If this precaution is not taken, the next best thing is to wash the hands in clean, warm water, without soap, directly after the operation, then rub the hands and especially the finger tips with vaseline. This is to prevent the painful cracking of the skin due to the action of the acid, which is otherwise difficult to avoid.

Beware of Slippery Pavements

"Do you know," said an enthusiastic motorist to another, "I wouldn't drive my car on a rainy day without anti-skid devices on the rear wheels for love nor money. I did it once. When the car got out on the shining asphalt boulevard, lubricated with water and the drippings of oil, the slipperiness of it all was most appalling. Can you remember the first time you put on a pair of roller or ice skates, or the first time you entered a strange drawing room with its highly polished floors and loose fur rugs; or did you ever step out onto the highly polished floor of a ballroom with a new pair of dancing shoes on your feet? Well, that is the way I felt as I glided over the slippery pavement. My brakes were absolutely useless, and I had to begin to slacken speed in the middle of every block in order to have the car under control at the crossings. By the time I reached the beginning of the business portion of the city I grew positively nervous, and decided to turn off in search of a less smooth but also less slippery street. As I swung cautiously around the corner I neglected to figure on

the camber of the road surface, and having entered the street on the wrong side of the crest of the road the car slid gently but firmly into the curbing. I ordered a new wheel and a set of chains."

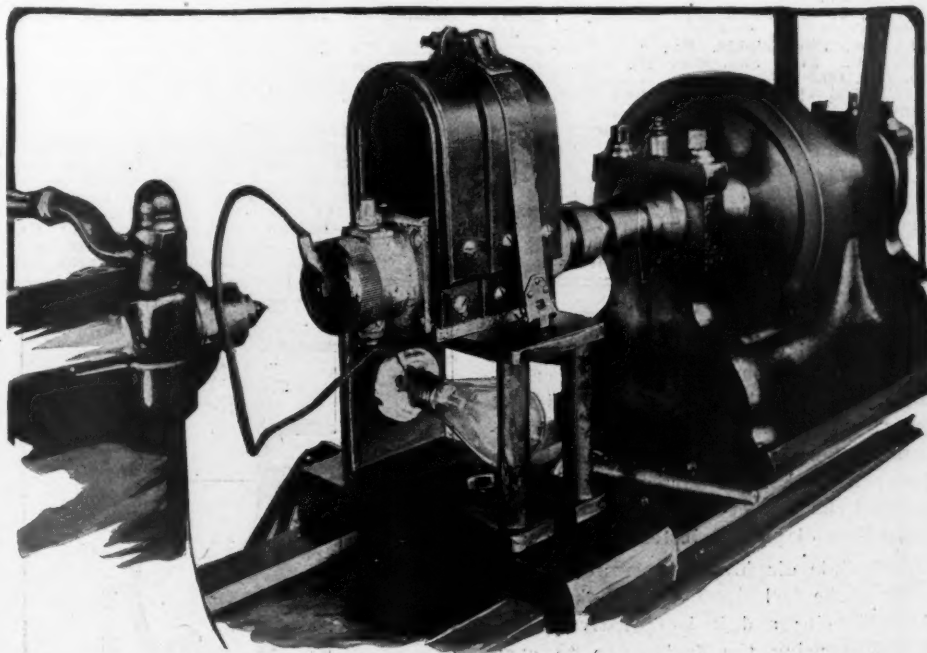
Advancing the Spark

The moment of contact at the commutator and the flashing of the spark at the plug in the cylinder practically are instantaneous, but there is an appreciable time between the spark and the time the gas becomes completely ignited. When the motor is running at a high rate of speed, in order to have the explosion take place when the piston is just beginning its downward stroke, the spark must occur when the piston is on its way up. To make the spark occur at an earlier point in the revolution of the motor is known as advancing the spark, and the spark advance is controlled by a lever on the steering post or over the steering wheel which acts on the commutator or the make-and-brake device of the magneto or both. If the motor is running at a low rate of speed and the spark is advanced too far it will cause the explosion before the piston has completed its upward stroke, and will create either a backward revolution of the crankshaft and stop or stall the motor, or it will make the motor knock or pound. When cranking the motor in start-

ing, if the spark lever is not fully retarded it is liable to cause a backward revolution of the crankshaft and the kick of the starting lever might cause serious injury to the operator.

Electrolyte—the Battery Fluid

The correct technical term for the fluid in a storage battery, which is often called acid, is electrolyte. This fluid is a mixture of four and one-half parts by volume of distilled water to one part of pure concentrated sulphuric acid. Should it become necessary to replace it on account of loss by spilling or leakage, the strength above indicated should be used; but evaporation loss should be made up with a more dilute acid, consisting of ten parts of water to one of pure concentrated sulphuric acid, or by pure water only if the acid is not conveniently obtainable. It is of the utmost importance that distilled water and the purest sulphuric acid be used, as impurities quickly affect not only the life of the battery plates but the proper working of the battery, particularly its ability to hold the charge for any length of time. Acids other than sulphuric will ruin the plates absolutely. At the beginning of the charge the electrolyte properly should be on a level with the tops of the plates, and at the end of the charge it will have risen about $\frac{1}{4}$ inch. Never use a match to examine the height of the fluid in regard to the tops of the plate while the battery is on charge, for the gases generated may ignite.



LATHE ATTACHMENT FOR TESTING MAGNETO IN LOCOMOBILE SHOP, CHICAGO

This device comprises a metal stand having means of quickly securing it to the lathe bed, an upper shelf designed to support the magneto to be tested and means for readily adjusting it so as to be driven from the lathe spindle; and a lamp mounted beneath the shelf having one terminal grounded on the stand and a wire communicating between its other terminal and the primary terminal of the magneto. At a certain known speed, the lamp will glow with a certain brilliancy. Failure to do so will indicate weak magnets, etc.



Current Motor Car Patents

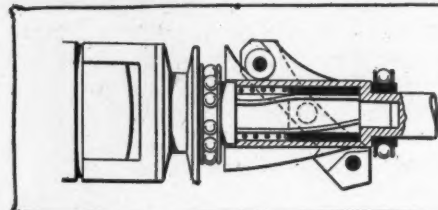


FIG. 1—DIEMER MAGNETO COUPLING

PATENTS ISSUED MAY 28, 1912.

1,027,409—Vehicle Wheel. John A. Etzold, Detroit, Mich. Filed April 26, 1910. Serial No. 557,772.

1,027,434—Vehicle Wheel. Abraham Grove Reaman, Ringwood, Ontario, Canada. Filed September 12, 1911. Serial No. 648,825.

1,027,447—Suspension Frame for Transmission Gear. Ernest M. Sternberg, Milwaukee, Wis. Filed December 17, 1910. Serial No. 597,895.

1,027,450—Anti-skid Device. Langdon S. Thompson, Jersey City, N. J. Filed January 2, 1912. Serial No. 668,902.

1,027,456—Carburetor. Roy E. Wood, Syracuse, Neb. Filed February 6, 1911. Serial No. 606,826.

1,027,459—Carburetor. Davis Bernard, Los Angeles, Cal. Filed September 9, 1910. Serial No. 581,242.

1,027,461—Air Gauge. Joseph A. Buttress, Los Angeles, Cal., assignor of one-fourth to S. Herlinger, Los Angeles, Cal. Filed April 8, 1911. Serial No. 619,698.

1,027,469—Muffler. Samuel W. Forney, Pulaski, Va. Filed August 29, 1911. Serial No. 646,576.

1,027,497—Tire-Tester. Edmund H. Neu, Pana, Ill. Filed February 5, 1912. Serial No. 675,404.

1,027,507—Vehicle Wheel. August Ferdinand Schulz, Milwaukee, Wis. Filed March 17, 1911. Serial No. 614,982.

1,027,522—Oil Cup. William H. Bressel and Robert O'Hara, Pocatello, Idaho. Filed August 15, 1911. Serial No. 644,181.

1,027,529—Lamp. Harry A. Douglas, Chicago, Ill., assignor to The Adams & Westlake Co., Chicago, Ill., a corporation of Illinois. Filed January 14, 1910. Serial No. 538,138.

1,027,541—Anti-Friction Bearing. Henry Hess, Wawa, Pa., assignor to the Hess-Bright Mfg. Co., Philadelphia, Pa., a corporation of Delaware. Filed September 24, 1909. Serial No. 519,315.

1,027,542—Anti-Friction Bearing. Henry Hess, Wawa, Pa., assignor to the Hess-Bright Mfg. Co., Philadelphia, Pa., a corporation of Delaware. Filed September 29, 1909. Serial No. 520,100.

1,027,550—Inductor Magneto. Robert C. Lanphier, Springfield, Ill., assignor to Sangamo Electric Co., Springfield, Ill., a corporation of Illinois. Filed October 9, 1909. Serial No. 521,947.

1,027,644—Shaft Coupling. Anton Diemer, Stuttgart, Germany, assignor to the firm of Robert Bosch, Stuttgart, Germany. Filed September 21, 1911. Serial No. 650,643.

1,027,647—Vehicle Wheel. Lucien R. Gruss, Chico, Cal., assignor to Auto Compressed Air

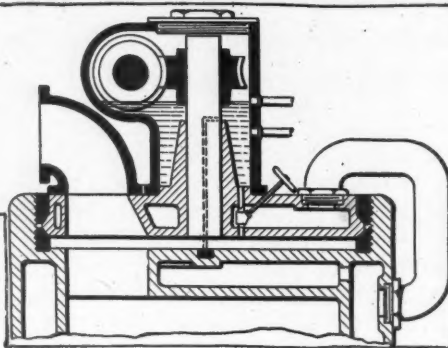


FIG. 2—BECK VALVE MECHANISM

Wheel Co., Chico, Cal., a corporation of California. Filed August 8, 1910. Serial 576,231.

1,027,648—Engine Starter. Edwin Guthrie, Washington, D. C. Filed March 1, 1912. Serial No. 680,913.

1,027,649—Gas Engine Starting Device. William A. Hansen, San Francisco, Cal. Filed December 13, 1910. Serial No. 597,025.

1,027,650—Gasoline Generator. Hans C. Hanson, Albert Lea, Minn., assignor to American Gas Machine Co., Albert Lea, Minn., a corporation of Minnesota. Filed June 26, 1911. Serial No. 635,429.

1,027,680—Internal Combustion Engine. Martin L. Williams, South Bend, Ind. Filed December 20, 1909. Serial No. 534,154.

1,027,684—Electrical Measuring Instrument. Walter E. Beede, New York, N. Y. Filed March 22, 1911. Serial No. 616,098.

1,027,700—Electric Lighting System for Self-Propelled Vehicles. James Kendall Delano, Jr., Chicago, Ill. Filed May 19, 1910. Serial No. 562,120.

1,027,733—Tire. Newton H. Horne, Kansas City, Mo. Filed July 19, 1911. Serial No. 639,385.

1,027,737—Lamp and Reflectors for Same. Charles Henry Kruger, Bradford, and Clifford Whiteley Collinson, Baildon, England. Filed May 16, 1911. Serial No. 627,443.

1,027,767—Variable Speed Transmission Device. Charles J. Robinson, Bremerton, Wash., assignor of one-half to Ernest E. Creelman, Bremerton, Wash. Filed February 23, 1911. Serial No. 610,357.

1,027,768—Carburetor. William E. Roby, Indianapolis, Ind. Filed April 28, 1911. Serial No. 623,896.

1,027,774—Phonograph Motor Signaling Device. Charles Schiff, West Orange, N. J., assignor by mesne assignments to Thomas A. Edison, Incorporated, West Orange, N. J., a corporation of New Jersey. Filed June 12, 1909. Serial No. 501,826.

1,027,775—Balancing Two Crank Engines. Franz Bernhard Karl Schubert, Hamburg, Germany, assignor to Co. of Deseniss & Jacobi Actiengesellschaft, Hamburg, Germany. Filed August 5, 1911. Serial No. 642,577.

1,027,798—Safety Cranking Device for Explosive Engines. John L. Beck, Springfield, Mass., assignor to The Auto Safety Crank Co.,

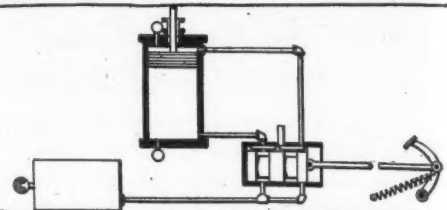


FIG. 4—NEW ENGINE STARTING DEVICE

Holyoke, Mass., a corporation of Massachusetts. Filed February 24, 1911. Serial No. 610,483.

1,027,799—Safety Cranking Device for Explosive Engines. John L. Beck, Springfield, Mass., assignor to The Auto Safety Crank Co., Holyoke, Mass., a corporation of Massachusetts. Filed March 20, 1911. Serial No. 615,676.

1,027,800—Pneumatic Tire Protector. Cuba A. Belew, San Diego, Cal. Filed January 8, 1912. Serial No. 670,053.

1,027,807—Vertical Engine. Leon Bollee, Le Mans, France. Filed November 14, 1907. Serial No. 402,190.

1,027,808—Motor Car Fender. Jayson K. Bond, Milwaukee, Wis., assignor of one-half to Kenneth W. Jacobs, Milwaukee, Wis. Filed March 2, 1911. Serial No. 611,763.

1,027,902—Ball Bearing. August Riebe, Weissensee, near Berlin, Germany. Filed March 23, 1910. Serial No. 551,071.

1,027,936—Indicating Attachment for Tanks. Joseph B. Turner, Cuero, Texas. Filed December 4, 1911. Serial No. 663,684.

1,027,957—Automatic Cranking Device. William H. Withers and Clifford T. Harris, Atlanta, Ga. Filed June 2, 1911. Serial No. 630,958.

1,027,977—Valve Mechanism. George C. Beck, Spokane, Wash., assignor of one-half to Eugene P. Ratzel, Detroit, Mich. Filed February 10, 1910. Serial No. 543,160.

1,027,983—Tire. James Bropson, Cleveland, Ohio, assignor of one-half to John A. Mangan, Cleveland, Ohio. Filed May 16, 1910. Serial No. 561,665.

1,028,009—Differential Gear for Motor Cars. Rosman I. Fancher, Baldwinville, N. Y., assignor of one-half to Frank L. Fuller, Syracuse, N. Y. Filed April 20, 1910. Serial No. 556,581.

1,028,019—Changeable Speed Friction Transmission Mechanism. Isaac B. Hammond, Portland, Ore. Filed February 26, 1910. Serial No. 689,045.

1,028,078—Variable Speed Transmission Gearing. Harry Beauregard Ross, Denver, Colo., assignor of one-half to H. Byrd Northrop, Denver, Colo. Filed May 12, 1911. Serial No. 626,823.

1,028,082—Wheel Construction for Motor Cars. Otto Zachow, Clintonville, Wis., assignor to The Badger Four Wheel Drive Auto Co., Clintonville, Wis. Filed August 6, 1909. Serial No. 511,657.

1,028,090—Detachable Spindle. Charles B. Wilson, Bartow, Fla., assignor to Jasper Sumrell, Bartow, Fla. Filed June 17, 1911. Serial No. 633,776.

ROBY Carburetor.—No. 1,027,768, dated May 28; to William E. Roby, Indianapolis, Ind.—As shown in Fig. 3 the carburetor to which this patent relates is not greatly unlike a well-known make of carburetor now in use; it differs radically, however, in that the admission of fuel to the fuel chamber of the carburetor is governed by a diaphragm instead of a float.

A flexible diaphragm is secured in the walls of the fuel chamber above the liquid level therein; and it is operatively connected, causing the fuel valve to open and close it by means of suction through the needle valve and the fuel in the fuel chamber. When there is a suction through the needle valve, the diaphragm is deflected causing the fuel valve to open and replenish the fuel in the chamber;

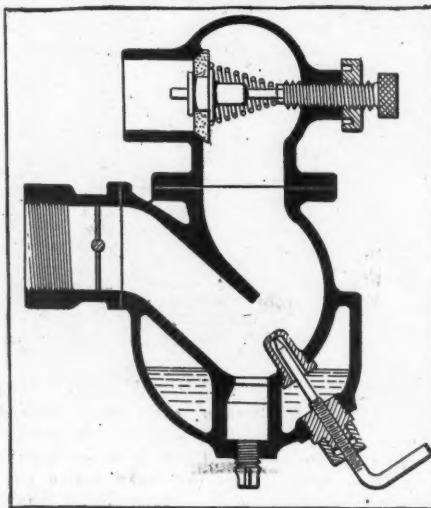


FIG. 4—NEW ENGINE-STARTING DEVICE

when the suction ceases the diaphragm assumes its normal position, thereby closing the fuel valve and stopping the admission of fuel.

Beck Valve Mechanism.—No. 1,027,977, dated May 28; to George C. Beck, Spokane, Wash.—This patent covers a cylinder head construction which as shown in Fig. 2, comprises a rotary disk valve for opening and closing the inlet and exhaust gas passages. As illustrated, the rotary disk is revolved by an integral vertical stem, and worm gearing running in oil. The stem is bored out as indicated by dotted lines to admit oil to the under side of the disk, and a valve-controlled duct is provided to admit oil to the upper face of the valve. A retaining member, adjustably secured in place by beveled rings, holds the disk in

place, and a lubricant container enclosing the valve operating gearing is mounted on this retainer. The cylinder head is thoroughly water-jacketed; as is also the retainer, short water bends or connections, one of which is shown, providing communication between the main cylinder jacket and that of the retainer.

Diemer Magneto Shaft Coupling—No. 1,027,644, dated May 28; to Anton Diemer, Stuttgart, Germany.—This patent covers a coupling such as is shown in Fig. 1. It is designed for application to a magneto shaft for the purpose of automatically advancing the armature of the magneto as the speed increases, and thereby automatically advance or retard the spark, without reducing the intensity of the spark even at low speed. The mechanism simply comprises a centrifugal governor arranged to move an internally spirally-grooved sleeve axially against the resistance of a spring. The end of the armature shaft of the magneto is externally threaded and adapted to co-operate with the sleeve. As the speed of the driving shaft increases, the centrifugal weights move outward, the sleeves move toward the magneto and the armature shaft is twisted around in an advanced direction relative to the driving shaft.

Engine Cranking Device—No. 1,027,957, dated May 28; to William H. Withers and Clifford T. Harris, Atlanta, Ga.—The cranking device covered by this patent may come under the head of the compressed air type, but it differs in that it does not admit air directly into the cylinders of the motor. It comprises as shown in Fig. 4, a compressed air tank, at the lower left, a valve chamber at the lower right, and a working cylinder above in the

center, having a double acting piston therein. There is a pedal for operating the valve, and on admitting compressed air to the working cylinder the piston therein which is connected through suitable gearing to the motor crankshaft, furnishes power to revolve it.



New Blue Books Appear

INCIDENT to the presentation of a vast deal more information, it has been found necessary to bring out another volume of the Automobile Blue Book—volume 5 for 1912—covering the territory of the middle west and the west. Volume 4 now contains the section from the Pennsylvania and Ohio state line west to the Mississippi river and from the Blue Grass region of Kentucky north to Lake Superior. Within these confines many improved routings are shown, as well as additions, notably in northern Michigan, southern Wisconsin, northern Indiana and Ohio, southern Illinois and from Louisville and Lexington, Ky., to Nashville, Tenn. In the vicinity of Chicago practically every tourable road within a radius of 100 miles of the city is mapped and routed. Also the through routing from Chicago and Buffalo is greatly improved, owing to improved roads in northern Indiana and Ohio.

Volume 5 contains that section from the Mississippi river to the coast, and with the exception of Iowa, which is, of course,

now included in this volume, and a few other lines, such, for instance, as the trunk lines from the Mississippi river to Chicago, the routings in No. 5 are new. Among the lines given are the Meridian highway, connecting Winnipeg, Canada, with the southern route to Los Angeles. Two lines across South Dakota, two across Nebraska, and three across Kansas lead to the trails of Colorado, connecting thence with the Santa Fe trail across New Mexico to Phoenix, or with the northern route via Salt Lake and across Nevada, branching at Ely, one taking the tourist to San Francisco and another diagonally across Nevada to Southern California. Grand Forks, S. D., is linked with Helena, Mont., but beyond that point no routing directions of the Northwest are given, although roads are shown on the map. This volume contains 35,000 miles of route data in the section west of the Mississippi river. Published by the Automobile Blue Book Pub. Co., 910 South Michigan avenue, Chicago. Price \$2.50.

Systems of Electric Ignition

The ignition system of a motor car is one of the hardest problems with which the average motorist has to combat, and to assist the car owner, the repairman, garageman, and others, Douglass Leechman, a member of the Institute of Automobile Engineers, London, in a book of 182 pages, entitled "Systems of Electric Ignition," discusses the various electric ignition systems. Including the dynamo accumulator and coil system, low-tension magneto with coil system and the high-tension magneto system. Practically all the ignition systems described are of foreign vintage. Published by The Car Illustrated, London.

Baker's New Extension Top Brougham Designed to Give Driver Clear Vision

RECENT agitation in regard to the danger incurred by carrying passengers in front of the driver, as is the usual type of enclosed electric vehicles, perhaps has had something to do with the production of the new extension brougham recently announced by the Baker Motor Vehicle Co., Cleveland, O. Whatever the reasons for the development of the new body, it has among other good features that of permitting all passengers to face forward, with the driver occupying one of the front seats.

The body is the new feature of the latest Baker electric, called the model Z-F. It is of slightly smaller dimensions and shorter wheelbase than the model Y brougham, but seats five, and except for the forward facing seats has the same general lines and appointments as the older model Y. The new model is equipped with revolving front seats and wheel steer, with controller handle located immediately below the wheel. The ghost view of the body illustrates the arrangement and shows the two individual front slats which revolve on their pillars.



BAKER'S NEW EXTENSION BROUGHAM BODY



From the Four Winds



TWO-PASSENGER SIX-CYLINDER NORWALK MODEL JUST BROUGHT OUT

OHIO to Use Convicts—By a contract awarded recently by the county commissioners of Summit county, Ohio, the Ghent road, west of Akron, will be improved by convict labor. The contract was awarded on a bid of \$17,889.89, with labor furnished by the state.

New Club at Bangor—The Bangor Automobile Club of Bangor, Me., was organized last week. The following officers were elected: Dr. Eugene B. Sanger, president; Taber D. Bailey, first vice-president; Dr. F. E. Maxwell, second vice-president; William C. Bryant, treasurer; W. A. Hennessey, secretary.

Uncle Sam Testing—Just how extensively motor cars will be used in connection with the postal service in New Orleans depends largely on the results of tests that are being made. Present experiments have to do with mail collections from drop boxes. It already has been shown that portions of the city can be served in one-third the time by using a light motor car, but it is more difficult to make a showing in sections where there is little asphalt paving. Tests will be made, however, on each route in the city under all possible weather conditions.

Cheaper Than Shoe Leather—H. R. Worral, a Ford owner of California, claims that it is cheaper to drive a Ford than to walk. This is the way that he has figured it. He had driven his runabout 1,000 miles, using 51 gallons of gasoline, costing \$5.56. This, with oil, grease, carbide and a 75-cent repair bill, makes a total of \$7.71, or less than 1 cent a mile. Before purchasing his car business required Mr. Worral to walk 5 miles a day, or 150 miles a month. A pair of \$4.50 shoes lasted him but 3 months, during which time he covered 450 miles. This made the cost

of shoe leather alone average 1 cent a mile, \$10 for a thousand miles, as against \$7.71 motoring cost.

Another Blow at Horse—The engraving on the papers of honorable discharge for firemen in Dunkirk, N. Y., who have served 5 years has been changed from the representation of a team of horses dashing with a steamer to a representation of the new motor fire engine responding to an alarm for fire.

Blames the Motor Car—International Secretary Marion Lawrence at the annual convention at Elgin, Ill., made the assertion that the motor car was largely responsible for the marked decline in offerings for Sunday school work. His statement was made during his appeal for funds to cover last year's deficit of the state association.

Maxwell Medal Winners—Gold medals have been awarded by the 50,000-Mile Maxwell Motor Club to sixteen members who have driven over 50,000 miles in their Maxwell cars. Three members who have proved mileages in excess of 100,000 are President Lee Meriwether of St. Louis, Mo., F. J. Griffin, a New York lawyer, and Clarence Cooper of 111 Clay street, Brooklyn. Mabel W. Davis of 1264 Main street, Buffalo, N. Y., is the first woman to qualify for a medal.

Another Trunk Line—As a result of the action of the Rhode Island legislature work will be commenced on an extension of the trunk line reaching across that state in a northwesterly direction that will touch the road at the Connecticut line that leads to Hartford and when completed it means that the capitals of the two states will be connected by a through trunk highway. As there are state roads connecting both these capitals with the Massachusetts highways leading to Boston, and a contin-

uation goes north from the Hub to New Hampshire into Concord, it means that all four state capitals are to be on through state routes.

First Over Cut-off—A. J. Gibson and party, of Missoula, Mont., arrived in Salt Lake last week over the Los Angeles cut-off from southern California and produced receipts to show that it cost more for photograph films than it did for gasoline to cover this trip. Mr. Gibson's party is the first tourists to travel the new short cut to Los Angeles by the way of Salt Lake, Ely, Nevada, Tonopah, Nevada, and down the Owens river to southern California. The distance is under 800 miles.

Safeguarding Railroad Crossings—The city of Oshkosh, Wis., has adopted an ordinance regulating the manner of using the streets by railroad companies and to provide for safe crossing over tracks located thereon. The railroads are required to provide planking or otherwise build up street crossings to grade for the convenience of vehicles and pedestrians. There have been several accidents because of the fact that at several crossings the rails have protruded above the street grade. Motorists have been especially active in promoting the passage of the ordinance.

California Growing—In the state of California the 4 months ending April 30, 1912, as compared with the same period in 1911 shows an increase of 4,518 cars. On a basis of \$1,000 for each, which is a conservative estimate, the state of California spent \$4,518,000 more for motor cars the first 4 months of this year than during the corresponding months of 1911. During the month of January, this year, 1,961 cars were registered in California; in February, 2,186. March showed an increase over February and 2,697 cars were sold. April was the best month with a total registration of 3,010. May is ahead of April, according to the dealers' reports.

Signboarding in Illinois—The Davenport Automobile Club is sending out pathfinders to mark the roads leading to various points in Illinois and adjacent states for the guidance of drivers who wish to reach the points of interest via the best roads. The committee has just completed marking the road from Davenport, Ia., to Peoria, Ill., via Milan and Galesburg. A white band 18 inches in width is being used to designate the poles along the road and signs at cross roads plainly denote the right way. The best roads for all of the principal points in Illinois are being thus designated and the roads of Iowa and Missouri are to receive similar attention. In addition to marking the routes, farmers along the roads selected are being ap-

pealed to, to utilize a drag in keeping the highway in good condition at all seasons of the year.

Panama to Build Road—At the offices of the canal commission it is announced that plans for the completion of the Panama canal call for a military road between Colon and Panama. This road will be 200 feet wide and will follow the course of the canal as closely as practicable. With such a road it is certain that Colon and Panama will become heavy buyers of motor cars.

Government Helping—J. C. Wonders, an expert from the office of good roads, department of agriculture, Washington, D. C., is in South Bend, Ind., to meet local parties interested in good roads and make a survey of the conditions in St. Joseph county preliminary to the work of road building soon to be started. St. Joseph is the first county in the state to have the services of a government expert in road building.

Generous Club Member—Baldwin Gwinn, a member of the Columbus Automobile Club of Columbus, O., has given the club a tract of 23 acres located on the National pike west of Columbus, about 20 miles out. It is proposed to erect a club house on the tract to cost in the neighborhood of \$3,500 for the use of the members of the club. The work on the building will be in the hands of a special committee to be named later.

Stirring Up Interest—The Omaha Auto-Motor Club and the Omaha Commercial Club have combined to stir up interest in the improvement of the highways near Omaha and through Nebraska, and to increase interest in travel over Nebraska pikes. They have outlined a series of three cross-country tours and a half-dozen of Omaha's best boosters will go along with the tourists each time. The first tour was made last Saturday, from Omaha to Sioux City and return. Stops were made at Calhoun, Blair, Herman, Tekamah, Craig, Oakland, Lyons, Walthill, Winnebago, Homer, Dakota City and Sioux City. The return journey was made the next day. The second trip will be to Kansas City

with intermediate stops, and the third to Cheyenne, with brief halts at Grand Island, Kearney, North Platte and other cities.

New on Pacific Coast—A new association was formed in Los Angeles last week, when owners of motor cars residing in the Mt. Washington district organized the Mt. Washington Automobile Association. G. W. Quinn was elected president; Dr. Milbank Johnson, vice-president, and E. G. Kuster, secretary. The organization will be a social one entirely, but will aid in every movement that tends to better the condition of the motorist.

Elkhart Legislating—At a recent meeting of the city council of Elkhart, Ind., steps were taken to place a new code of motor regulations. Ordinances were introduced to compel owners to carry electric searchlights, to use mufflers, to stop the engine when the car is standing still, and also refuse a license to anyone under 16 years of age. For failure to perform or comply with the law a fine of from \$1 to \$50 with a jail sentence of 30 to 60 days has been proposed.

Motor Travel to Mt. Tacoma—June 20 has been announced as the date on which the National Park inn will be opened on Mt. Tacoma to tourists and the real heavy travel to the park will begin at that time. There is no closed season for motor cars entering the vault of natural scenery. Ten thousand, three hundred and six persons pass in through the gates of the park, mostly by motor car, and this record is expected to be put far in the shade during the present season.

Ohio Experimenting—The Ohio state highway commission is going to do extensive experimenting in highway construction during the present season and has selected a stretch of road leading from the Hartman farm into Columbus as the place for the experiments. The county commissioners have given the necessary permission. The reason for the selection of the road is the fact that there are no branches leading into it and the entire road would have practically the same traffic wear. It is proposed to divide the road into sec-

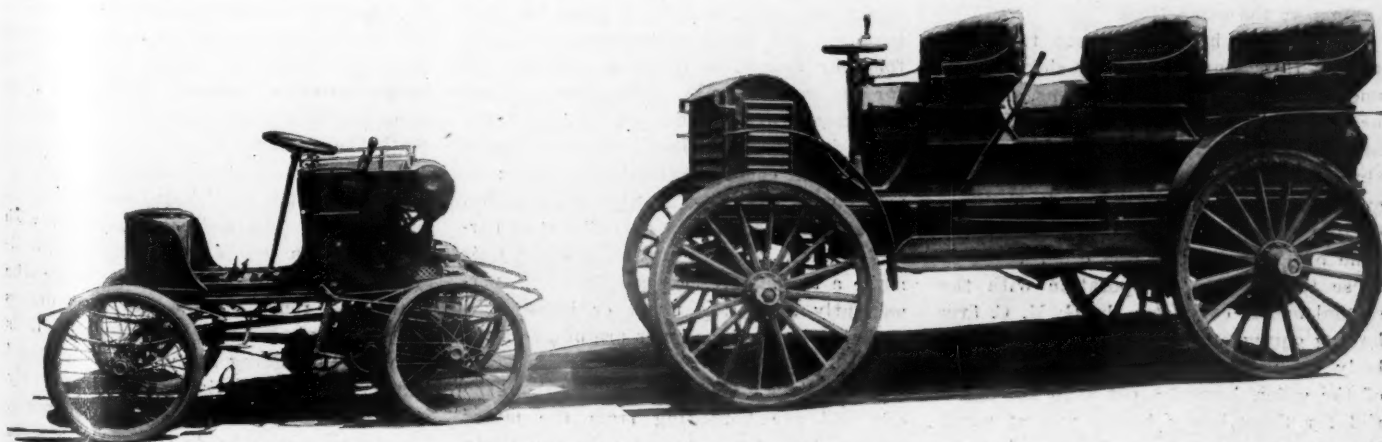
tions to give all road material men a chance to build a section and compare it with the other sections of the road.

Polite Chief of Police—Chief of Police E. G. Allen of Decatur, Ill., is adopting a new method to secure compliance with the law. Owners of cars who have neglected to take out a new license, who operate their cars at night without lights, or who otherwise transgress, are not being arrested, but receive a polite letter of warning from the chief.

Ohio Interested in Convict Labor—Seventy-five convicts of the Ohio penitentiary started work Monday at Carroll on the roads. The plan to be followed is to permit the convicts to select their captain and lieutenants and the discipline will be modeled after the United States army. This is a sort of experiment in using convicts on the highways in Ohio.

At Work on Trunk Road—Work on the improvement of a principal highway between Chicago and Milwaukee has been started by the Chicago-Milwaukee Good Roads Association. The work is in two divisions, the members in each state contributing and doing the work in that state. The association is raising \$6,000 to \$10,000 for the work by memberships of \$2 per annum and voluntary contributions. The road will be in shape for the heavy travel expected from Chicago to Milwaukee for the big road racing carnival in September.

Maryland License Fees—The report of Motor Vehicle Commissioner Roe of Maryland to Governor Goldsborough for the year ended May 1 shows the receipts from motor vehicles for the year to have been \$80,000. The principal sources of receipts were from passenger vehicles, \$73,768.75; merchandise vehicles, \$1,360.50; dealers and manufacturers, \$3,571.50; motor cycles, \$1,846.05. Not included in this sum were receipts from indirect sources such as motor vehicle operators, \$7,934; motor cycle operators, \$696; fines, \$3,114; motor vehicle tags, \$379.97; interest on deposits, \$339.44; from Washington, D. C., agent, \$166.68.



TWO OF AMERICA'S OLDEST MOTOR CARS

The first illustration shows a Columbia car, built 17 years ago, and in service 14 years. The other shows a car designed by a Californian in 1876, which now is owned by the United States Motor Co.

The Realm of the



Motor a Winner as a Strike-Breaker

THE motor truck has been a great advantage to Chicago newspapers during the present strike, enabling them to make deliveries under conditions where a team could have been easily put out of commission by opposing strikers, for a moving motor truck commands respect from mere men afoot, whereas with horse equipment the slash of a knife, as the team goes by, can strip the harness.

The International Paper Co. was the first Chicago concern connected with the strike to foresee the advantages of the motor vehicles and to profit from its foresight. When the strike was declared the various paper companies of Chicago received notice from the teaming companies which deliver their paper under contract that they would be unable to make paper deliveries. The paper companies with one exception immediately passed the word along to the newspapers, and notified them that they would have to do their own hauling from the railway yards.

Motor Trucks Tried

The paper comes in rolls, ordinarily 70 inches long and each roll weighing 1,300 pounds. When horsed wagons were used a four-horse team hauled ordinarily an 8-ton load of these rolls. Drivers of the horse wagons refused to make more than four deliveries per day on a 2-mile haul, spending the rest of the time loafing. When the word of the termination of contract by the teaming companies came to the International Paper Co. it determined not only to continue its deliveries but to try and increase the efficiency of the delivery system at the same time.

On May 10 horse rigs were tried and failed. Horses grew suddenly sick; wheels unexpectedly came off the wagons, and harness broke or vanished completely. Shortly after an order was placed on contract for three G. M. C. 5-ton motor trucks with special bodies and two Speedwell machines of like capacity. Within 6 hours of the time of the receipt of the order three of these trucks were in operation with the special bodies complete; the G. M. C. firm having equipment for turning out its own body work. It was stated that on receipt of the order, however, not even the material for these heavy bodies was at hand. Ten men were put to work on each body and the work was turned out in the time named—exclusive of paint. At the end

Power Vehicles Render Invaluable Service to Chicago Dailies in Hauling Paper and Ink—Successful Operation of Big Trucks Results in Decision to Continue Their Use

of that period the machines were on the streets under the charge of drivers strange to that make of truck, though highly paid and extra-efficient men. Each driver was under the chaperonage and protection of a representative of the law, with one exception. One of the drivers refused to have an officer on the machine with him, declaring that he could fight his own battles. He is still at work and delivering the goods.

The motor trucks in this service have been running an average of 15 miles per day. When four trucks were operating to the various newspapers a load was delivered every 40 minutes, these being loads of only one tier of five rolls on account of the strike at the freight houses which tied up the loading proposition. Thus strikes at this time hindered at both the loading and unloading ends, yet the machines operated without hitch.

On one day 104 rolls of paper were delivered to the Chicago Tribune by four trucks between the hours of 11 a. m. and 1 p. m., these being 70-inch rolls. From 1 to 5 p. m., 146 rolls were delivered to the Chicago Daily News. The haul on this date was from the Grand Trunk terminal at Taylor street and Plymouth court, a run of about 1 mile each way.

Horses Slow in Comparison

Horse equipment would have carried but thirty-two rolls for a day's work for each team or, for equal comparison, 128 rolls for four four-horse teams as against 250 for the motor trucks. Thus the motored equipment, even under strike disadvantages, is delivering almost twice the paper that teams could accomplish in times of peace with the same number of vehicles.

With one tier of rolls only five were carried at a trip, whereas at present eight rolls make a load. If trucks are taken on permanently a 6½-ton truck or larger will probably be used, as loads are of necessity large.

Other lines in Chicago have taken the cue and are benefiting from the motor equipments. On a recent date the Daily News was unable to obtain delivery of ink and sent a motor truck to the ink man-

ufacturers on its own account. On arrival the men of the ink firm refused to load the machine, so that the drivers were up to the necessity of loading their own vehicle with 650-pound barrels of ink while a crowd of strikers jeered at their efforts. The load was finally put on, however, and delivered without trouble, though with horses the delivery could easily have been interfered with.

Advantages of Motor

Thus is indicated a new advantage of the motor truck for continued service and as trucks are used a higher class of men will be in charge working to motor truck speed at better wages, who will not insist that half of their time be spent in loafing or that four loads will be a day's work when seven or eight could easily be accomplished with a little extra effort.

As a result of the work of the trucks for the International Paper Co. during the strike two of the Chicago newspapers have decided to adopt motor equipment for paper delivery after the strike is over.

SECOND HEATING SAVED

The board of works of Detroit has been making an exceedingly practical use of a big 5-ton G. M. C. truck, which it recently bought for the use of the asphalt-laying department. The city maintains its own asphalt plant in the outskirts of town. It has been accustomed to having the asphalt drawn from the plant to the scene of its laying as a pavement by teams. This has required a second heating, in order to make the material available for laying. With the addition of the truck, however, a new system has been installed.

The asphalt is now loaded into the truck, piping hot. The load is blanketed with heavy canvas and is rushed rapidly to the scene of paving operations. There the blanket is removed and the truck dumps the hot asphalt on the spot where it is wanted, thus doing away with the second heating of the material, and saving a very considerable amount of time and expense. The truck is able to do the work of eight teams, as well as saving enough time to obviate the second heating.

Commercial Car

Army Officer's Ideal Military Truck

Lieutenant B. F. Miller Gives Specifications of How He Thinks War Vehicle Should Be Built—Discusses Method of Equipping Militia With Power-Driven Vehicles

By B. F. Miller

First Lieutenant, Twenty-seventh United States Infantry

IN a former article I discussed some of the requirements of a motor truck for the use of the regular army and after considerable study of the subject I believe that the following specifications come very near to the requirements for government service both with the regular army and for the militia; the latter branch of the service I will discuss later. My idea, as shown in an accompanying illustration, would be a freight vehicle with caterpillar drive, as follows:

Engine—Any standard make, four-cylinder, four-cycle, about 25 brake horsepower, equipped with standard engine equipment.

Front Wheels—Wood with iron tires. Caterpillar arrangement to be of size to conform with maximum limit of weight of truck.

Speeds—Three forward and one reverse; forward, 1½ miles per hour, 2¾ miles normal, and high 5 miles per hour; reserve, 2¾ miles per hour.

Weight—Maximum weight empty, about 4,000 pounds.

Normal load—Two tons on truck. Truck to be provided with hitch behind for pulling trailer wagon carrying a load of about 2 tons.

Body—Any kind most adapted to use. Military scout wagon body with tent may be used for ordinary military hauling. If used for hauling ammunition, a body convenient in form for handling ammunition boxes may be used.

Power Is Needed

The truck should be of sufficient power to pull a field artillery gun and camp the ammunition for the gun on the chassis. It will readily be seen that with the caterpillar drive the truck can be used on all kinds of roads with varying conditions of ice, mud, rocks, grades, etc. This would make the truck valuable in a commercial way for country districts and anywhere there are poor roads. If desired, when the roads are good the caterpillar arrangement may be removed and a rear axle with drive wheels put on. The only change necessary will be to lengthen the drive

chains. The transmission is put in rear of the rear axle so that when the caterpillar is used most of the weight will be on the caterpillar, as the front wheels are intended for steering and carrying the weight of the engine.

Caterpillar Drive

It might be explained for the benefit of those who are not familiar with the caterpillar form of drive that it is a form of construction by which the vehicle virtually lays its own track as it moves and then runs over it. The general construction is that of a roller chain running between sprocket wheels near each end of the vehicle, the rollers or wheels of this chain running underneath a track rigid to the car body between the wheels. Fastened to the chain and between it and the ground are cross bars like railway ties. Thus, as the drive wheels of the car turn this chain runs forward over the top of the wheels, carrying the ties with it at twice the car speed, rolls down around the front wheel until it lays the ties in the road, then stays still while the car runs over it on its chain rollers.

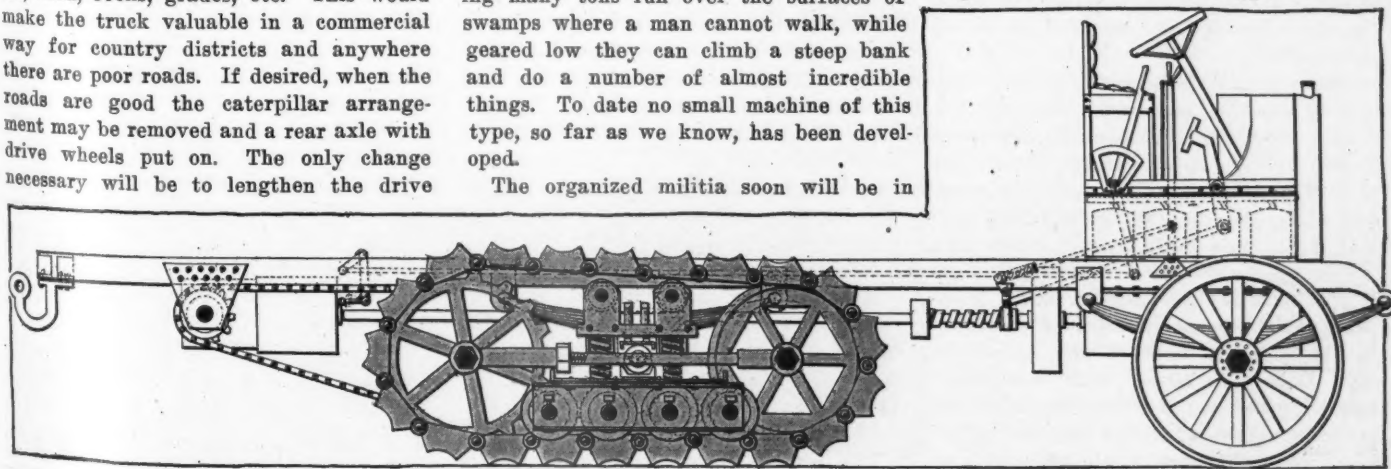
With this construction machines weighing many tons run over the surfaces of swamps where a man cannot walk, while geared low they can climb a steep bank and do a number of almost incredible things. To date no small machine of this type, so far as we know, has been developed.

The organized militia soon will be in

need of a new means of transportation in time of service. It is becoming difficult to obtain draught animals on short notice when the militia is called into service, and increasingly so as the motored vehicles further encroach on the territory heretofore held by the horse and mule. To equip the militia permanently with draught animals entails too great an upkeep expense. A motored equipment will be the eventual solution.

The Militia Situation

The militia situation is very different from that of other branches of military service and brings up different problems for solution. The purpose of the organized militia of the United States, as provided for by the constitution, is for enforcing the laws, quelling insurrections and repelling invasions. In time of trouble we would have to depend on the organized militia to reinforce our small regular army, and it would seem highly important to have this militia properly equipped for active service. When called into the service of the United States the organized militia must be equipped as provided for the regular army. At the present time most of the militia is well equipped in every way except in wagon trains and animals for the motive power. The importance of having proper equipment of trains and the inability of an army to move without them is well known. The arms, uniforms, ammunition and other supplies are furnished or can be furnished from the liberal appropriations made by congress for the support of the organized militia. These supplies can be



LIEUTENANT MILLER'S IDEA OF MILITARY MOTOR TRUCK UTILIZING CATERPILLAR DRIVE

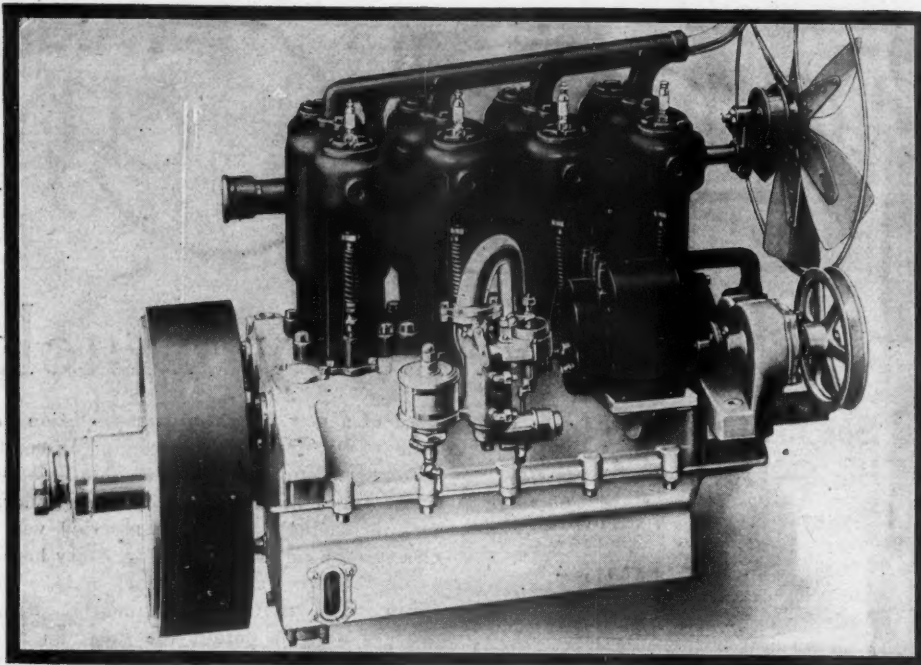


FIG. 1—MOTOR USED IN PIGGINS MOTOR TRUCK

stored in the armories and arsenals until needed, and, once provided, cause little additional expense. The wagons, harness and guns for field artillery also could be provided and kept in the same manner, but the horses and mules for the motive power would be difficult to obtain should the militia be suddenly called into the service of the United States in the time of national danger.

Keeping Track of Horses

A possible solution of the difficulty in obtaining animals would be for the militia authorities to keep themselves informed of the suitable horses and mules to be obtained in their vicinity, from the farmers, liverymen, etc., and each commanding officer to keep an option on the number of animals necessary to supply his organization or headquarters. These animals could be inspected, when the annual inspection of militia is made, to see that the military requirements are complied with, and in case of the militia suddenly being called into the service of the United States, vouchers could be given the owners of the animals and these animals could be taken to the concentration camps with the organizations.

While the above method might be feasible for small organizations in country districts, there would be numerous difficulties in carrying it out in the large cities. The motor trucks and other mechanical hauling appliances are rapidly replacing animal-drawn vehicles and the horses and mules will become more and more difficult to obtain. For this reason, should it prove practicable, mechanical hauling apparatus should be the most satisfactory for militia use. Once purchased, this mechanical hauling apparatus could be stored in the armories until needed and the cost of upkeep would be very small when not in use. When going to maneuver camps and

on marches and problems the militia could then be properly equipped with transportation.

The transportation required under the present regulations prescribing animal-drawn transportation are field trains, combat trains and ammunition trains that must be able to accompany the marching troops. Supply trains are needed for large organizations. The standard vehicle now used is the army escort wagon pulled by four mules and carrying a normal load of 3,000 pounds. These wagons are formed into trains, the number depending on the size of the organization. For one company of infantry is required one escort wagon; for one regiment of infantry are required twenty-five wagons, of which six are for ammunition, and for one division—our largest unit for forming armies, about 10,000 men—is required 662 wagons for supplies, 107 wagons for combat and ammunition trains and forty-eight ambulances for sick and wounded.

Needs of the Militia

Taking the approximate strength of our available organized militia as 100,000, then it will be apparent that it takes a large number of wagons and animals to properly equip the approximately five divisions. If some form of mechanically-operated vehicles could be substituted for the above ones that are to be animal-drawn, the efficiency and availability for immediate service of our organized militia would be materially increased.

For the escort wagons used in the field, combat, ammunition and division supply train, some form of motor truck, that comes up to the requirement for military use, will be the most probable substitute. The militia would probably not be supplied with heavy trains.

The general military requirement would be that the mechanically-operated vehi-

cles must be able to travel over any road or ground under all conditions of mud, ice, roughness and grades that the loaded four-mule army escort wagon can and must not be too heavy for the military and country road bridges that may be encountered by marching troops. The normal speed of animal-drawn wagons is from 2 to 2½ miles per hour loaded, and as these trains accompany the marching troops who make the same speed, therefore the normal speed of the mechanically operated vehicles should be about 2½ miles per hour. There should be another speed geared to 5 miles per hour for traveling light and over good roads; and another speed geared to 1½ miles per hour for emergencies and very bad roads. For use with cavalry and horse artillery other speeds could be provided. As the commercial motor trucks have a higher normal speed than required for military use, it would seem that the engines for military trucks should be adapted to run at about one-half the number of revolutions per minute of the commercial trucks. This would make for economy of fuel and lubricants. The power lost by the lower speed could be obtained by the proper arrangement of the gearing of the transmission.

Strength of Bridges

As military wagons must cross both the military bridges and the bridges encountered on country roads, the limit of weight should, if possible, be not more than 2½ tons loaded. The limit on military bridges is about 4 tons center load.

If some of the commercial motor trucks of the proper weight could be fitted with some device to give proper traction to the drive wheels, for all conditions of footing on slippery, muddy and icy roads, no doubt these trucks would prove efficient for the use of the militia. Should the tractive device prove efficient and the engine and transmission furnish sufficient power, then it is possible that a trailer wagon could be pulled behind. The motor-hauling apparatus could be operated by men detailed from the troops, as in a militia organization there are always a number of men experienced in the use of motor vehicles.

Should motor hauling be found practicable to replace the wagon trains, then no doubt it could be developed so as to haul the ammunition and pull the guns of the field batteries. At the present time few militia batteries are provided with horses on account of the cost of upkeep, and in time of war it would be field batteries that we would need the most.

Should the motor trade develop a machine suitable for the military use and the requirements of the organized militia, there is no doubt that in addition to selling a large number for the use of army and militia organizations, there would be a ready sale for it among the farmers, haulers, country merchants and others unable to use the ordinary motor truck on account of poor roads.

External Gear Drive a Piggins' Feature

THE Piggins Motor Truck Co., Racine, Wis., is now manufacturing a new truck known as the Practical Piggins, which differs from other standard commercial vehicle designs in that it employs external gear drive to the rear wheels. It is made in four models, of various capacities, between 1 and 5 tons.

A general idea of Piggins' design may be obtained from a view of the chassis shown in Fig. 2. It comprises a four-cylinder water-cooled T-type motor; a leather-faced cone clutch; a selective, sliding-clutch transmission gearset giving three forward speeds and reverse; a propeller shaft inclosed in a torsion tube and having but one single universal joint at the forward end; and a combination live and dead rear axle with the wheels mounted on the dead axle driven by spur gearing from the live axle. The main frame, and the sub-frame on which the motor and change-speed gearset are mounted, both are of channel section, and the main frame is supported on semi-elliptic front and three-quarter platform rear springs. Wheels are 36 inches in diameter and wheelbase is 115 inches.

The motor is rather unique in that it has no external inlet gas manifold; there being only a short pipe or bend communicating between the carbureter, and a passage-way incorporated in the upper portion of the cast aluminum crankcase. There are openings in this passage-way which register with openings at the bottom of vertical passage-ways cast integrally with the cylinders and communicating with the inlet-valve chambers above. This construction greatly simplifies the motor by eliminating the number of separate joints, rendering the inlet valves more accessible, and making it possible to remove any one cylinder without disturbing the inlet gas connections of the other cylinders.

Valves are on opposite sides and operated by adjustable pushrods. The camshafts and cams are of tool steel, and the cams are secured to the shafts with taper

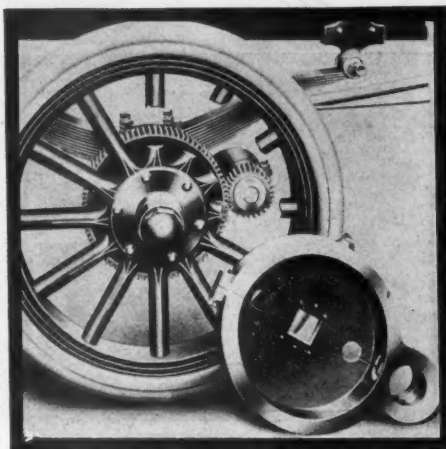


FIG. 3—PIGGINS SPUR GEAR DRIVE

pins and riveted. Spiral gearing is employed in the engine to promote noiseless operation of the camshafts, magneto, and oil and water pumps. A nickel steel crankshaft is used which is mounted on five babbitt bearings; and the connecting rods are drop forgings, with babbitt bearings on the crankshaft and bronze bushings for the piston pins.

Power from the motor is absorbed by a leather-faced cone clutch, and a short shaft connection transmits the power to the transmission gearset which sets a short distance back on the same subframe that supports the motor. The gearset is a Cotta design in which the gears always are in mesh and the speed changes are obtained by means of sliding clutches. This construction facilitates gear-changing; all gears and the countershaft are idle when the car is operating on direct drive, third speed; and there is no danger from chipping and clashing gears.

A propeller shaft, inclosed in a torsion tube and having a single universal joint at its forward end, communicates between the transmission change-speed gearset and the bevel gears of the floating live rear axle driving mechanism; and to the ends of the transverse driveshafts of this rear-

axle driving mechanism are attached the spur gears that drive the wheels which are mounted on the solid or dead portion of the rear axle. These gears are inclosed in dust-proof cases filled with grease. The supplementary or live portion of the rear axle oscillates in babbitted bearings bolted to solid axle; thus the entire load is carried by the solid axle and there is no such strain on the driving axle.

INTERURBAN SERVICES STARTED

Using a twenty-five passenger Wilcox truck the Semmes Motor Line has been organized to run a passenger service between Washington, D. C., and Brandywine, Md., a distance of 17 miles. The route is through a rich farming country and is not now served by either steam railroad or trolley. If the traffic warrants the promoters will add other machines and will gradually extend the route until it covers Marlboro and Leonardtown, Md. A freight service, in which Wilcox trucks will be used, also will be inaugurated. A regular schedule will be maintained, two round trips being made each day. It is expected the service will be started June 10.

A motor bus line, in which White trucks are used, has been established in Rock Creek park, Washington, D. C., by the Imperial Motor Co., White agent in that city. The park is one of the finest of the kind in the country and lies on the outskirts of the national capital. Heretofore it has been inaccessible to all except motorists or those owning horses and carriages, but the installation of the motor bus line will open it up to the general public. The bus will make hourly trips between 8 o'clock in the morning until 11 o'clock at night, and the service will be maintained regardless of weather conditions. The trip through the park consumes 1 hour and a fare of 15 cents is charged.

PORTLAND BUYING MORE CARS

Expenditures for the operation and maintenance of municipal motor cars by the city of Portland, Ore., to which attention was called recently because of some figures compiled by the city auditor, brought out the fact that Portland has virtually transformed its departments, in so far as means of conveyance is concerned. It was but 4 years ago that the first city-owned car was purchased for the fire chief and which has been in constant use since and it is still considered as good as new. Since then the city has bought twenty motor cars. Nearly every department head has one; the water department has several. And the end is not yet; for the fire service is to install ten or a dozen motor hose and chemical combination carts of the same pattern as the two that are now a part of the department. It is now proposed to build a municipal garage.

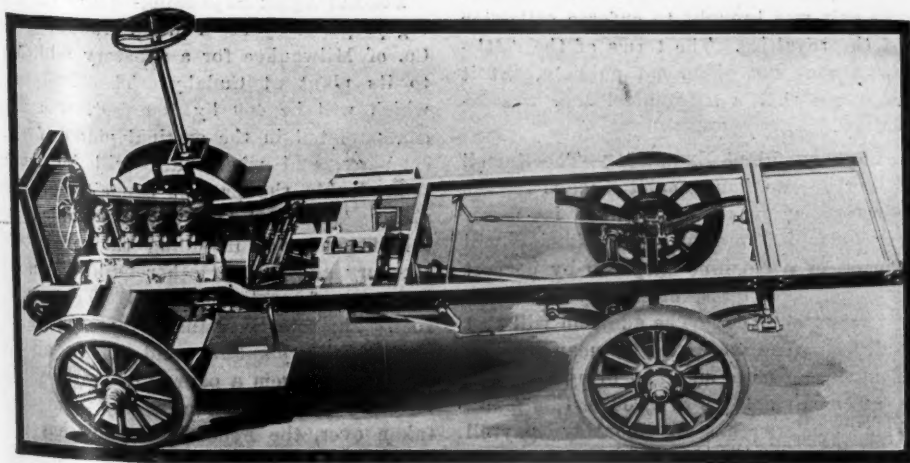
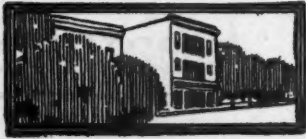
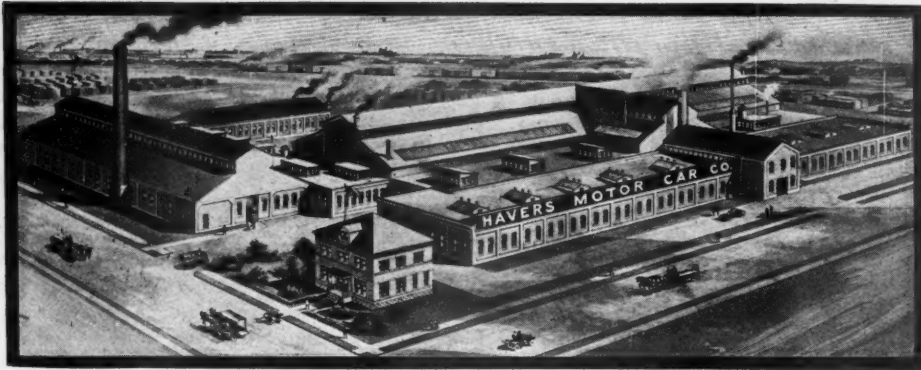


FIG. 2—CHASSIS OF THE NEW PIGGINS MOTOR TRUCK



Among the Makers and Dealers



PLANT OF HAVERS MOTOR CAR CO. AT PORT HURON, MICH.

OHIO Dealer Dies—John B. Wilson, formerly president of the Bowling Green Motor Car Co., Bowling Green, O., died recently from a complication of ailments.

Asks for Receiver—On an account of \$15, Charles B. Haines has brought suit in the superior court at Indianapolis asking that a receiver be appointed for the Indiana Tire Filler Co. of that city. Haines alleges in his complaint that the company is in danger of insolvency. It is possible the matter may be adjusted and a receiver not appointed.

Receiver Takes Elmer Property—The H. Elmer property at Elkhart, Ind., has gone into the hands of a receiver on the petition of C. L. Monger, a lumber dealer of Elkhart. The receiver is to take charge of the property which was once the Elkhart Motor Car Co. and later the Elmer Automobile Co. and finally the H. Elmer Co. Senator Robert E. Proctor was appointed receiver.

Moriarty Out with Packard—E. P. Moriarty & Co. of Kansas City are relinquishing the Packard account, which they have had for 7 years, and are taking in its place the 1913 Lozier line. In addition they will handle the Abbott-Detroit line which has been handled by the Kaw Valley Automobile Co., of which J. F. Moriarty is the manager; the Kaw Valley company being merged in the new arrangement, and a new company being formed to be known as the Moriarty Brothers Motor Car Co.

Would Stop Building Work—Claude A. P. Turner, of Minneapolis, has filed a bill of complaint in equity in the United States district court in Toledo to restrain the Willys-Overland Co. from erecting an addition to its plant in Cycledale addition, using what he claims is a method on which he holds patent rights. W. E. Woods, George S. Mills and George V. Rhines are also named as defendants. Turner says he has a patent on a method of skeleton steel concrete construction which he alleges the Overland people and other de-

fendants used illegally in the construction of one of the Overland companies' new buildings and he wants the building torn down.

Graham Changes Jobs—John A. Graham, formerly superintendent of assembling and testing at the Brightwood Motor and Mfg. Co., of Springfield, Mass., has been appointed engineer and superintendent of the Westfield Motor Truck Co.

Reopens at Manitowoc—The Aluminum Castings Co. of Cleveland, O., which some weeks ago closed its plant at Manitowoc, Wis., because of labor troubles and announced its intention of giving this principal western plant to Milwaukee, has reopened at Manitowoc and it is believed that the company intends to operate there permanently. The striking workmen, more than 400 in number, are returning to their benches slowly and outside help is being obtained to fill the other places. The company made no concessions to the strikers.

Rim Suit Settled—Settlement of the suit of Gilbert vs. the Republic Rubber Co. has been made and the suit has been discontinued in the United States district court in New York. The matter at issue was a claim by J. M. Gilbert founded upon a license covering a rim device. The Republic company took out the license and the suit was brought to enforce collection of the royalties. The terms of the settlement were not given out publicly, but it is stated that a substantial sum was involved.

Canadian Plant Expanding—The Russell Motor Car Co. has completed plans for the construction of an addition to its motor car plant in Toronto. The addition will consist of a machine shop 170 by 60 feet equipped with latest machinery for motor car manufacturing. The addition will cost \$100,000. The increase will mean employment of 200 more men and bring the total number of employees to 1,200 in this plant. This concern has a monthly payroll amounting to \$75,000 and the output of the Russell factory has increased 80 per

cent over last year. The concern has just completed and occupied its new office building.

Home, Roof Garden and Garage—Louis Allis, of Milwaukee, son of the founder of the Allis-Chalmers Co., of Milwaukee, is introducing a new idea in combination buildings at Milwaukee. Mr. Allis has awarded contracts for the erection of a three-story residence, the top of which will be a tiled roof garden and the basement a garage with room for five cars. The living rooms will be between the garage and roof garden. The residence is being erected at Juneau avenue and Martin street, overlooking Lake Michigan.

To Make Motors—The Sheboygan Machine Co. of Sheboygan, Wis., organized recently as a corporation with \$10,000 capital, is preparing to engage in the manufacture of motors and gasoline engines of several types. The organizers of the company were until recently active in the management of the Falls Machine Co. of Sheboygan Falls, Wis., which builds engines. L. Nelson and Charles Kummer are the moving spirits in the new enterprise. The former Kohler plant at Sheboygan, at one time one of the largest foundry and machine shops in Wisconsin, has been leased for factory purposes.

Firestone Stock for Sale—The Firestone Tire and Rubber Co. of Akron, O., is offering for sale the balance of the common stock in the treasury at \$250 per share. Shareholders are given the preference in subscribing for the stock at the rate of 10 per cent of their present holdings. The provision is made that the stock can be paid for at the rate of 25 per cent, June 1; 25 per cent on June 29 and 50 per cent July 20. Receipts will be issued for fractional parts of shares, but they will not participate in the dividends but will be redeemable between August 15 and September 1 at the rate of \$262.50 for a full share.

Federal Again Expanding—Plans are being prepared by the Federal Rubber Mfg. Co. of Milwaukee for a six-story addition to its plant at Cudahy. This building, which will be 400 by 100 feet, was not contemplated in the original plans of the company, and when built will be more than double the present capacity of the plant. The total floor space occupied at the present, not including the projected six-story addition, or other buildings now in course of construction, is 170,000 square feet. The total investment represented in the Cudahy plant is said to be about \$1,300,000. From a payroll of thirty-eight men last July, when the Cudahy plant was taken over, the Federal company has increased its factory force alone to 428 men, while the sales and engineering forces

bring this figure to nearly 600. Besides there is a construction force at work on new buildings and remodeling of 125 to 130 men.

Havers' Big Plant—The Havers Motor Car Co.'s factory located at Port Huron, Mich., is devoted exclusively to the manufacture of the Havers six-cylinder. The present plant has over 150,000 square feet of floor space with extensive additions planned for this fall.

Castle Moving to Richmond—It is announced that the Castle Automobile Lamp Co., Amesbury, Mass., will move from that city to Richmond, Ind., where the company has purchased the factory formerly occupied by the Richmond Mfg. Co. The company employs about 200 men.

Joins Indianapolis Colony—The New-Miller Mfg. Co., maker of the Miller carburetor, announces the establishment of its factory and general offices in the Murphy building, East Georgia street, Indianapolis. The Miller carburetor has been a California product. The new Indianapolis factory has a capacity of over 70,000 carburetors a year. F. C. Fairbanks is president of the company, A. W. Nash vice-president, K. K. Parrot secretary, and L. H. Colvin, formerly sales manager of the Warner Mfg. Co. of Toledo, will act as general manager of the plant.

Canada Ships to Australia—When the New Zealand liner Whakatane sailed from Montreal May 29 for Melbourne, Auckland, Lyttleton, Sydney and other antipodean ports, it carried as part of its general cargo 260 motor cars of Canadian manufacture, the largest shipment of cars ever sent out of Canada on a single vessel, it is claimed. It is only within recent years that Canadian cars have been sent abroad, and since the trade started it has grown by leaps and bounds, testifying in an emphatic manner to the excellence of Canadian workmanship. Last year the steamer Melville, of the Elder Dempster line, took

over 150 cars to South Africa. Essentially a freighter, the Whakatane takes 52 days to reach Melbourne, South Australia, its first port of call.

Studebakers' Wagon Business—As showing that the motor car has not materially affected their other interests, the Studebakers report that the profits from their wagon business reach \$600,000, as against \$900,000 before the coming of the motor car.

Stearns Adding to Plant—A large new addition to the offices of the F. B. Stearns Co., Cleveland, is being completed, and plans to give the factory additional facilities are under way also. This is in addition to the Royal Tourist factory, which is being operated by the Stearns people as their shop No. 3.

Indiana Engineers Meet—The May meeting of the Indiana branch of the Society of Automobile Engineers was one of the best attended the association has held since it was organized a few months ago. The meeting was held at the Claypool hotel in Indianapolis and motor car interests from all parts of the state attended. Those who read papers on electric lighting, ignition and starting as applied to the motor car were C. F. Kettering, vice-president of the Dayton Engineering Laboratories Co. and J. W. Esterline, president of the Esterline company, Lafayette.

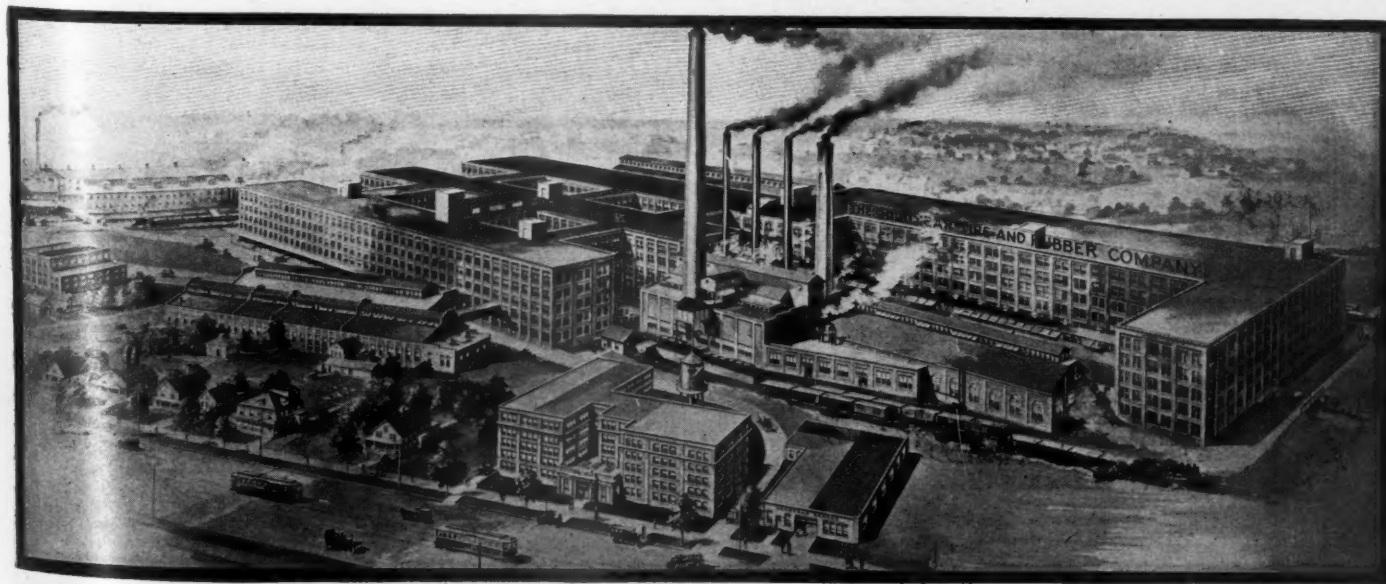
Headquarters in Bloomington—Bloomington has been chosen as the headquarters of the Automobile Dealers' Association of Illinois. This association was organized in Chicago last fall. Articles of incorporation have been issued by the secretary of state, the incorporators being Basil Ogg, Springfield; D. Estaque, Jacksonville; C. A. Myers, Joliet, and J. L. Murray, Bloomington. The last named is secretary and treasurer. The principal object of the new association is to secure better highways and to promote the mutual welfare of the dealers. The associa-

tion is holding monthly meetings at various cities of Illinois and the membership is growing rapidly, having reached 150 at the last report.

Millikan Buys Engine Plant—Frank M. Millikan, vice-president of the National City Bank, Indianapolis, has purchased through the Security Trust Co., receiver, Indianapolis, the assets of the Indiana Motor Mfg. Co. of Franklin, Ind., which manufactures the Continental. The price paid was \$20,000 and it is reported a new company will be organized at once to continue the manufacture of the car.

Dealer Expanding—By taking over the Genge Motor Co. garage, 2655 University avenue, St. Paul, the White Bear Automobile Co., A. J. Dismon, president, lays claim to being the largest motor concern in the northwest. The company plans service garages in all parts of the city. It occupies one building in St. Paul, another at White Bear lake and a third is building.

Discovers Veteran Car—Among the ancient and modern forms of transportation at the travel show in Grand Central palace, New York, is a motor car whose design dates back to 1876. The old car was loaned to the management by Benjamin Briscoe, president of the United States Motor Co., who discovered it in California several years ago while he was stopping at the Cliff house, San Francisco. The proprietor, who formerly was an easterner, went to the coast in the 60's and, lacking transportation facilities, he employed a mechanic and set out to build a horseless carriage. It was 1876 before his drawings were finished and the car was not completed until 1895. It was put in service and used until 1906 when Mr. Briscoe induced the proprietor to take it out of his barn and ship it to the Maxwell factory at Tarrytown, N. Y. Mr. Briscoe points out that the car embodied features which were being claimed as new inventions long after this old car had been completed.



THE GOODYEAR TIRE AND RUBBER CO.'S PLANT AT AKRON, OHIO, SHOWING THE ADMINISTRATION BUILDING AND GARAGE. THE PLANT NOW HAS A FLOOR SPACE OF 1,000,000 SQUARE FEET AND EMPLOYS 5,000 PEOPLE



Development Briefs



Speedometer Measures Grades

THE Stewart & Clark Mfg. Co., Chicago, has just brought out a new and improved style of 4-inch speedometer with a rotating dial constructed after the Stewart type of tachometer. Not only is the new instrument a simpler construction, but it comprises, in addition to the speed indicating mechanism and trip and season mileage recorders or odometers, a grade indicator that will show the percentage of the grade of any hill or incline up which the car may be traveling or on which it may rest.

This is the first time that a grade indicator has been incorporated in a speedom-

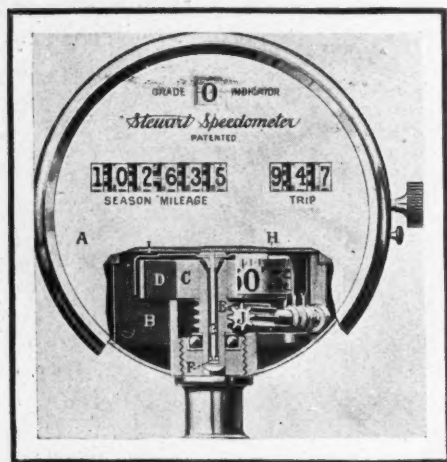


FIG. 1—COMBINED GRADOMETER AND SPEEDOMETER

eter; and it is intended to make possible the more rational use of the speed changing levers when ascending hills. It is claimed that there are few who drive their motor cars up a hill with efficient or sufficiently intelligent use of the speed-changing levers; but with an indicator before them to show the steepness of the ascent they will be more careful not to overburden their engines.

Among the improvements to be found in the new instrument, which is shown partly in section in Fig. 1, are: the direct drive which eliminates two of the bevel gears employed on the other instruments; and the use of a closed ring magnet which increases its permanency by serving as its own keeper, and eliminates the necessity of the field plate and its complications. The use of springs in the odometer is also entirely eliminated.

As shown in the illustration, A is the containing cup or casing. B is a frame on which the parts are assembled. C is the generator or rotor. D is the permanent magnet. E is the spindle to which the flexible shaft from the road wheel is attached. F is the cap and crown jewel bearing. And stepped in this bearing is the

New Speedometer with Gradometer Attachment—Design of Latest Continental Motor—Water Bags for Desert Tourists—No-Spark Cigar Hood

shaft G, that supports the inverted aluminum cup H, on which is printed the scale indicating miles per hour. The fixed plate I serves as a support for the top jewel guide and one end of the restraining spring; and the other end of this spring is secured to the shaft G to which the aluminum cup is fixed. J is a pinion for driving the odometer, or mileage recorder.

In operation, the perfectly balanced aluminum cup H is mounted in the field of the permanent magnet B, and is acted upon by the magnetism when the magnet is rotated. The magnetic pull on the cup is resisted by a carefully calibrated clock spring, so as to be directly proportional to the speed at which the magnet is rotated.

Waterproof Finish for Tops

Rub-On Varnish Co., Buffalo, N. Y., is manufacturing a waterproof dressing for motor car tops under the name of Rub-R-Tite. It is said to be as pliable as the top itself and does not crack off. One coat, it is stated, waterproofs cloth tops, two or three coats, gum surfaces them to give them the appearance of a leather top.

Blood Universal Joints

The latest type of universal joints offered by the Blood Bros. Machine Co., Kalamazoo, Mich., is called the style M and is illustrated in Fig. 2. It has a center block journal and locking pins with large hardened steel bushings similar to those of the older models, but instead of having grease cups for holding the lubricant a metal case is used which covers all the working parts. The open end of this case is closed by a heavy oil-tight leather disk pressed in concave shape. The outer edge is secured to the inner wall of the case by means of a steel ring pressed in tight, and the inner edge is held securely to the hub of the working end of the joint with a taper threaded sleeve screwed over the leather.

New Michelin Clincher Tire

The latest product of the Michelin Tire Co. is a new quick detachable clincher tire so designed that it is easy to put on any quick detachable rim. It is designed to eliminate the necessity for careful fitting, but is simply dropped on the rim without requiring the use of tools. Another feature of the tire is the elimination of the inside envelope flap or tube protector. This simplifies the fitting of

any tube and is said to reduce the danger of pinching. The new clincher is of full round shape with a broad, flat tread.

Nospark Cigar Hood

Motorists who are smokers will appreciate the usefulness of a device for preventing the ashes and fire being blown away from the cigar in the wind. Such a device is the Nospark made by the Nospark Co., Oshkosh, Wis. This is a little aluminum screen hood that fits over the end of the cigar. It is designed to give good ventilation to the cigar on all sides and weighs $\frac{1}{2}$ oz.

Gilmer Tire Repair Pliers

Tire experts claim that the life of a tire can be greatly lengthened if small cuts and abrasions in the casing are filled up with some of the plastic compounds on the market before dirt and water have had an opportunity to cause much damage. The only way to make such a repair permanent is to open the cut, clean out the dirt, wash with gasoline and then apply the filling compound or cement. This compound should be cemented to the fabric. If this is done and the rubber allowed to close over it it is held that the gum will be compressed against the fabric and use will tend only to make the repair more permanent. Without some means of opening up the cut and insuring a clean repair, such a permanent patch cannot be made. To properly open the cut the Gilmer tire repair pliers have been brought out by G. Walker Gilmer, Jr., Philadelphia, Pa. These pliers with their method of use are illustrated in Fig. 5. One jaw of these pliers in conjunction with a

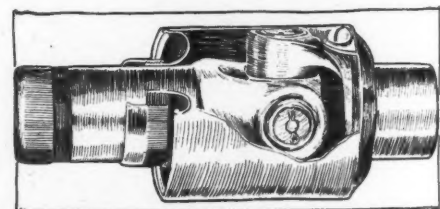


FIG. 2—BLOOD UNIVERSAL JOINT

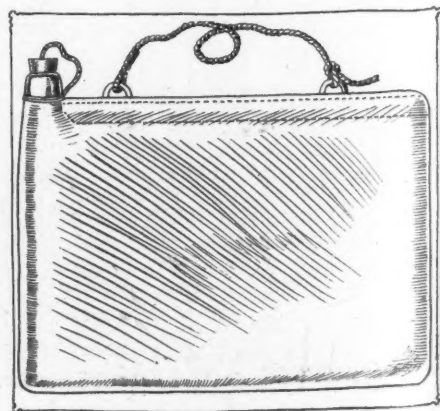


FIG. 3—DESERT WATER BAG

lever composed of two handles forms one side; the other jaw and the central lever form the other side. The jaws are bent down to right angles to the plier and shaped into two long, thin lips which can be brought together and inserted in the cut. The entire operation is executed with one hand. To bring the jaws together pressure on the central lever and one outside lever is required. To open the jaws, press on the central lever and the other outside lever.

Bathrick Automatic Carbureter

In Fig. 6 is illustrated the Bathrick carbureter, the product of the Chicago Carbureter Co., Chicago, Ill. One of the features claimed for it is that the mixture is correct under all circumstances because

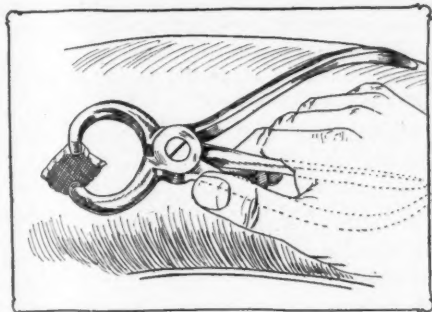


FIG. 5—GILMER TIRE REPAIR PLIERS

the air and gasoline openings are interconnected and are operated entirely by the suction of the pistons in the engine. There is a simple arrangement whereby the proportions of air and gasoline can be varied to meet the requirements of any engine. The carbureter is of the float-feed type provided with a cork float whose action operates the fuel valve through the arm and collar G and needle valve below it. There is a straight opening through the carbureter from the bottom to the top which is of uniform size except at the bottom, where the opening is tapered. In the bottom of this taper opening is a flat disk closing the air inlet.

When air is sucked through the opening this disk rises against a small spring which has only sufficient tension to insure the disk seating when there is no suction. When this disk rises with a rush of air it operates a cam on the outside through an arm and elbow C. The movement of the cam is regulated by the thumb nut B, the cam in turn operating an arm D that opens the gasoline needle valve which is adjusted at A. There is no adjustment on the air. It is only necessary to adjust the gasoline supply. The thumb nut A, directly on the needle valve, adjusts for low speed and a nut B on the cam adjusts for high speed. An arrangement for attaching to the front of the radiator and connected by a wire to the end of the lever D is provided so that the roller F can be lifted $\frac{1}{4}$ inch to $\frac{3}{8}$ inch off the cam and held there while the motor is being started.

Desert Water Bags

Motorists who take long tours, particularly when the trip extends through country where water is scarce, are accustomed to carry with them a supply of water for drinking purposes. The usual method of carrying the water is in bottles in the car or covered buckets hung on the car. The chief objection to both methods is that on hot days the water becomes too warm to be refreshing. A bag in which water may be carried by motorists has recently been brought out by W. A. Plummer, San Francisco. It is called the Desert water bag and is so constructed that capillary attraction from the inside and evaporation from the outside keep the water cool on the hottest days. It is stated that warm water will reduce rapidly to a low temperature by this natural action of refrigeration and remain cool and palatable for several days, especially when exposed to the draft of air when hanging on a car that is traveling at speed. The bag is made of a special weave of imported flax and appears in three sizes, 1, $2\frac{1}{2}$ and 5-

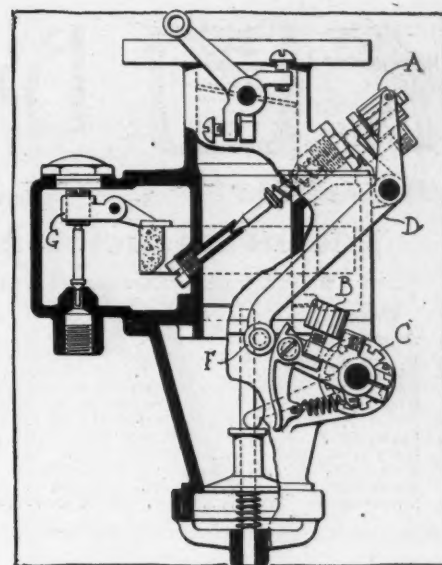


FIG. 6—BATHRICK CARBURETER

gallon capacities, respectively. The larger sizes provide cool water for the radiator as well as for drinking purposes.

New Continental Motor

In Fig. 4 is shown side and end sectional views of the latest motor made by the Continental Motor Mfg. Co., Muskegon, Mich.

The company manufactures two four-cylinder motors, one with $3\frac{1}{2}$ -inch bore and 5-inch stroke and the other a $3\frac{1}{2}$ by 4-inch known as the Continental Junior. The former is a double ball bearing cast-in-pairs engine of the L-head type. It has a special valve adjustment and dust-proof silencing arrangement. All valves are of the same size and are of large diameter, with small lift. The cooling either is thermo-syphon or by positive pump, the magneto drive and pad allowing for this choice. The crankcase is of the barrel type. Pressure feed is used in the lubrication scheme. When this model is made in the six-cylinder style three bearings are used and the cylinders grouped in threes. The Junior has three plain bearings.

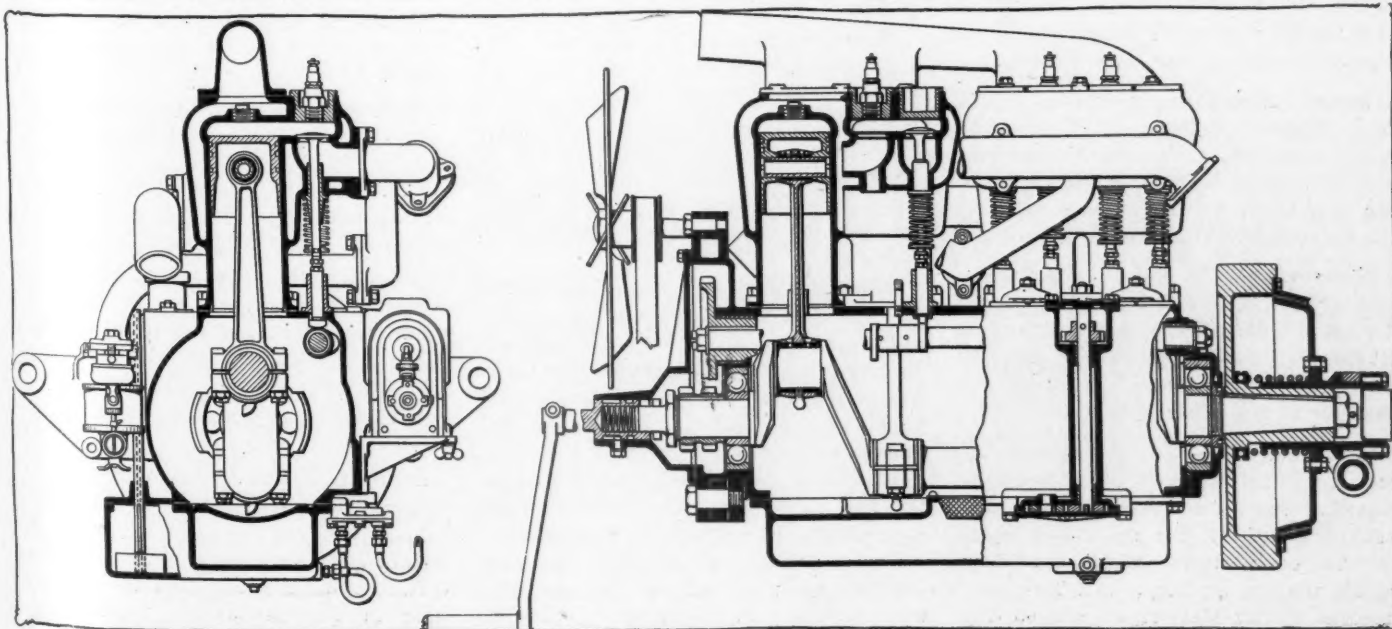


FIG. 4—SECTIONAL VIEWS OF NEW CONTINENTAL MOTOR



Brief Business Announcements

Recent Agencies Appointed by Pleasure Car Manufacturers

Town	Agent	Make	Town	Agent	Car.
Akron, O.	H. F. M. Mfg. Co.	Velle	Oakland, Cal.	W. J. Freeling	Warren
Auburn, N. Y.	Auburn Automobile Co.	Havers	Passaic, N. J.	Charles Speer	Havers
Columbia, Pa.	W. T. Garrison	Franklin	Philadelphia, Pa.	A. M. Pearson	Locomobile
Columbus, O.	Adamson Automobile Co.	Blair	Sacramento, Cal.	L. B. Harvey	Oldsmobile
Findlay, O.	Collingwood & Edwards	Rambler	San Jose, Cal.	W. J. Boschken & Co.	Oakland
Findlay, O.	Collingwood & Edwards	Detroit	Salem, Mass.	Church-Donovan Co.	Buick
Hamilton, O.	Central Motor Co.	Velle	Sydney, Australia	Commonwealth Motor Co.	Havers
Hamilton, O.	Central Motor Co.	Velle	Troy, N. Y.	Vanderheyden Garage Co.	Havers
Mansfield, O.	C. H. Voegelé	Velle	Wilkes Barre, Pa.	W. S. Lee	Krit
Mansfield, O.	C. H. Voegelé	Velle	York, Pa.	Auto and Trucks Sales Co.	Baker
Minneapolis, Minn.	E. F. Chase Co.	Havers			

CINCINNATI, O.—The Victor Lamp Co. has opened a Detroit office at 811 Woodward avenue.

New Haven, Conn.—F. B. Alling has formed the Alling Garage Co. and has opened a garage at 480 Winthrop avenue.

Pittsburgh, Pa.—E. L. Duffee has been made manager of the Fisk Rubber Co. The company's plant is located in Baum street.

Milwaukee, Wis.—The Franklin Auto and Supply Co. is enlarging its quarters to include a frontage from 321 to 327 Fourth street.

Biddeford, Me.—The new garage of the Etchells Auto Co. at Five Points is now completed, giving the company a capacity for twenty-five cars.

Salem, Mass.—William H. Church and John J. Donovan, who recently secured the agency in this city for the Buick line, have opened a new garage on Washington street.

Hagerstown, Md.—The Antietam Garage Co. has completed an arrangement to represent the Franklin Automobile Co. in this territory as direct dealer, its former connection having been as sub-dealer.

Boston, Mass.—Harry Eisner & Co., New England distributors of the Eismann magnetos, have opened new quarters at 1074 Boylston street directly over the Hupmobile branch, having outgrown the old quarters at 24 Cambria street.

Watertown, N. Y.—Louis Berg, for the past 4 years chief mechanical engineer at the Babcock Mfg. Co.'s plant and designer of the first Babcock motor car, has left that concern to become secretary and treasurer of the Miser Schaff Co.

Milwaukee, Wis.—A. C. Templeton has been appointed manager of sales of the Kisselkar Co., 178-182 Seventh street, Milwaukee, distributor for the Kissel Motor Car Co. of Hartford, Wis., in a large middle western territory. Mr. Templeton succeeds William MacDougall, who on May 1 became vice-president and sales man-

ager of the Juno Motor Truck Co., of Juneau, Wis.

Columbus, O.—P. L. Long has opened a tire-repairing establishment at 33 South Fourth street.

Baltimore, Md.—The Palmer-Singer car is being handled in this territory by Roy M. Upton, who is temporarily located at Hamilton.

Saskatoon, Sask.—J. A. MacMillan and T. W. Renwick are interested in the Saskatchewan Motor Works, a new concern with a capital of \$50,000.

Washington, D. C.—Charles Myers has been appointed agent for the Elmore and has opened a salesroom and service department at 925 D street, N. W.

Syracuse, N. Y.—F. J. Haynes, who has been factory manager with the H. H. Franklin Mfg. Co. since 1904, has resigned to accept a position with Dodge Brothers of Detroit.

Pittsburgh, Pa.—At a meeting of the Diamond & Higgins Repair Co. in its new building at South Beatty and Mignonette streets, G. Diamond was elected treasurer and P. J. Higgins was made manager.

Worcester, Mass.—The Regal and Metz cars will be handled in this city and Worcester county by the Regal and Metz Motor Car Co., a new concern with which S. A. Stevens, G. R. Green and F. E. Thompson are connected. Headquarters for the Regal models and those of the little Metz car have been established on Exchange.

Portland, Me.—The Maine Motor Car Co., a \$50,000 corporation, has been formed at Portland to succeed the Maine Motor Carriage Co. The new company has taken over the agency portion of the old company, but the latter will continue the garage and accessory business until November 1, when it will be turned over to the new corporation. The officers of the new company are A. H. Hinds, president; George A. Wagg, vice-president and general manager; Ernest Brewer, secretary and treasurer; F. O. Bailey, Clifford S. Randall, A. C. Harlow, Portland, H. S.

Mudgett, Intervale, N. H., and C. S. Lord, Alfred, Me., directors.

Kansas City, Mo.—The Swinehart Rubber Co. of Akron, O., has established a branch at 1812 Grand avenue.

Bethlehem, N. H.—E. L. Merow is altering the big stables at the Alpine house, Bethlehem, transforming them into a modern garage.

Kansas City, Mo.—The Marquette branch of the General Motors Co. has established a factory branch at 1416 Grand avenue. W. C. Morris is the manager.

Detroit, Mich.—The Thompson Auto Co., 972 Woodward avenue, has completed a large brick addition to its garage, which gives it approximately 4,000 square feet of floor space.

Cleveland, O.—John F. Singleton, for 6 years advertising manager of the Firestone Tire and Rubber Co., has organized the John F. Singleton Co. with offices in the Citizens building.

Boston, Mass.—Work has started on the foundation of the new Lozier building on Commonwealth avenue and it is expected that the new structure will be completed and ready for occupancy about September 1.

Baltimore, Md.—The Chesapeake Motor Car Co., which has just taken on the agency for the Hupmobile in the state of Maryland, has located its garage at 810 Madison avenue. Carroll P. Thweatt is manager.

Wausau, Wis.—The Reams Motor Car Co., formed by P. V. O. Van Vechten and K. J. Reams, is erecting a brick and steel garage, 60 by 120 feet, at Third and McIndoe streets. The company will also handle pleasure cars, motor trucks and accessories.

Bayonne, N. J.—The consulting metallurgical business conducted by E. F. Lake at Bayonne has been merged with the metallurgical engineering firm of Nixon & Raab under the name of Lake, Nixon & Raab, 156 Fairview avenue, South Orange, N. J. Die-casting machinery, alloys and

processes and the heat-treatment and carbonizing of steel will be specialized upon.

Hartford, Conn.—A large concrete block addition has been added to the structure occupied by the New England Garage Co.

Colorado Springs, Colo.—G. W. Blake, Franklin dealer in this territory, is erecting a modern garage and salesroom on Nevada street.

Baltimore, Md.—The Gramm truck is to have a new home at Oak and Twentieth streets, where the Enterprise Coal Co., agent, has arranged for a new building.

Elmira, N. Y.—R. J. Lindsay, manager of the local branch of the A. M. Zimbrich motor car agency, resigned that position and entered the employ of the American LaFrance Fire Engine Co.

Davenport, Ia.—The Union Motor Co., agent for the Oldsmobile and the Buick, 114 Brady street, is erecting a new garage at Third and Warren streets, the present quarters having been outgrown.

Akron, O.—The Ideal Commercial Car Co. is building a large plant at South and Railroads streets and will soon commence the manufacture of Ideal cars. This company formerly was located at Detroit.

Owen Sound.—The new garage being built by the Kilborn Co. on the bank of the river at Ninth street has been leased by the Owen Sound Pressed Steel Co. and will be occupied by them as general motor car repair shop.

Buffalo, N. Y.—The Flanders electric agency has moved to 719 Main street. Formerly these machines were sold by the Excelsior Sales Co. at 730 Main street, but increasing business necessitated the removal to larger quarters.

Niagara Falls, N. Y.—The United States Light and Heating Co. has awarded a \$70,000 contract to the Leonard Construction Co. of Chicago for the erection of an annex to the local concern to be used as a machine shop. The addition will be 320 by 56 feet and three stories in height.

The Eveland self-starter is being manufactured in this plant.

Dunkirk, N. Y.—The Niagara Gasoline Motor Co. will establish its plant here if \$50,000 worth of stock can be subscribed.

Detroit, Mich.—John Calder will assist the management in the general organization and production work of the Cadillac Motor Car Co.

San Francisco, Cal.—The W. D. Newerf Rubber Co. has opened a branch store in San Francisco, for distributing its product, Miller tires, in northern California.

Baltimore, Md.—The distributing station for the Dahl punctureless tires for Maryland and Virginia has been established on North Charles street near Lafayette avenue by Hart & Co.

Phoenix, Ariz.—The Arizona Motor Co., F. A. Carr, manager, state agent for the Abbott-Detroit, Krit and Brush cars, has leased the old Tremain garage, with a floor space of some 600 feet, and using it for their salesroom and garage. W. D. Tremain has removed to a new building at Seventh avenue and Adams street.

Worcester, Mass.—The Worcester Electric Vehicle Co., connected with the Worcester Electric Lighting Co., has taken over the agency of the Detroit electric cars, both pleasure and commercial. Headquarters of the Worcester Electric Vehicle Co. are in the same building and office as that of the Electric Light Co. on Fenway street.

Nashua, N. H.—The City Garage Co. has been incorporated at Nashua by George L. Erb, who is president and treasurer, with John K. Martin as manager. The new company has purchased the garage and repair business of the City Carriage Co., also the carriage and motor car painting business conducted by the company for years. Major Shaw of the old company will personally continue the agencies of the Bergdoll, Maxwell and Regal cars and the International Harvester truck that he has handled for some

years, making his headquarters at the new company's office.

Baltimore, Md.—The Kelly-Springfield Tire Co. has located at 1421 North Charles street, where it now has its branch house and service station.

Louisville, Ky.—Henry Colgan, formerly connected with the Hite D. Bowman Co., is the new manager of the Waverley Electric Co. in Louisville. He succeeds Wright Barr, who goes to the factory at Indianapolis.

Omaha, Neb.—The Cole Motor Co. last week established a factory branch here for the sale of Cole cars. For the present the sales room will be at 1102 Farnam street. E. E. Butler, of this city, will be in charge.

Milwaukee, Wis.—The George Brumder estate of Milwaukee has started work on the construction of a \$45,000 public garage building at Eighth and Wells streets, Milwaukee. The tenants have not been decided upon, nearly a dozen agencies having asked for whole or part.

Buffalo, N. Y.—The Manufacturers' Service Co., recently incorporated with \$10,000 capital, will manufacture machinery for motor-car factories and power plants. The directors are Walter J. Minehan, Herbert W. Huntington, Daniel E. Meegan, H. Barton Perry, all of Buffalo.

Windsor, Ont.—Backed by several Detroit men, the National Body Co., Ltd., has been organized and will manufacture motor car bodies for the Canadian trade. A 3-acre site has been secured, on which will be erected a two-story brick factory, 300 by 55 feet. The company will incorporate with a capital of \$100,000.

Providence, R. I.—The Kendall garage at Broad and Potter streets, one of the largest and most recently constructed in the city, was totally destroyed by fire recently. It was supposed to be fireproof, but the flames gutted it badly. Many of the cars were taken out and saved, but the loss will reach about \$30,000.

Albany, N. Y.—Northern Motor Car Co., capital stock, \$25,000; incorporators, R. Dudley Cannon, A. P. James, J. S. McClellan.

Boston, Mass.—Hubmark Rubber Co., capital stock, \$25,000; to manufacture rubber goods, tires, etc.; directors, G. H. Mayo, O. W. Smith, W. H. Mayo.

Boston, Mass.—Roberts & Sherburne, Inc., capital stock, \$30,000; to deal in motor cars; president, E. R. Sherburne; treasurer, F. L. Roberts.

Cambridge City, Ind.—Auto Inn, capital stock, \$10,000; to deal in motor cars; directors, A. Boyd, J. A. Boyd, J. L. Boyd.

Camden, N. J.—General Auto Co., capital stock, \$50,000; incorporator, F. A. Kunts.

Charleston, S. C.—Robinson Automobile Co., capital stock, \$20,000; incorporators, C. B. Huie, W. B. Wilbur.

Chicago—Motor Sales Co., capital stock, \$10,000; to manufacture motors; incorporators, I. N. Walker, F. L. Coff, M. M. Miller.

Chicago—Illinois Electric Motors Mfg. Co., capital stock, \$5,000; to manufacture and sell electric motors and apparatus; incorporators, A. F. Richmond, J. R. Semple, E. E. Benedict.

Chicago—Ohio Motor Car Distributing Co., capital stock, \$5,000; to manufacture and deal in motor cars; incorporators, J. Slotow, S. G. Wood, F. C. Churchill.

Huntington, Ind.—Big Four Auto Co., capital stock, \$3,000; directors, Daniel Shinkel, Lewis Shinkel, W. Richardson.

Recent Incorporations

Huntington, N. Y.—Bergen Garage, capital stock, \$5,000; directors, A. S. Bergen, H. F. Doughty, J. H. Doughty.

Indianapolis, Ind.—Automobile Resilient Tire Filler Co., capital stock, \$10,000; directors, W. H. Disher, A. C. Balfour, J. Moffat.

Louisville, Ky.—Stanley Automobile Co., capital stock, \$2,000; incorporators, E. C. Walker, G. H. Laib, W. B. Young.

Melrose, Mass.—Smith Brothers Garage, capital stock, \$1,000; directors, R. W. Smith, R. W. Smith, Jr., L. A. Smith.

New York—American Carburetion Co., capital stock, \$5,000; to manufacture carbureters and parts; incorporators, W. H. Woolley, A. G. Hubbell, J. F. Bisselle.

New York—Robert Stock Auto Spring Wheel Co., capital stock, \$300,000; incorporators, R. Stock, A. M. Stock, J. F. Bokelmann.

New York—Audubon Auto Service Co., capital stock, \$500; incorporators, M. P. Caffé, E. Huerstel, J. M. Ferguson.

New York—Velitch Motor Mfg. Co., capital stock, \$200,000; to manufacture motors and motor cars; incorporators, J. S. Harris, P. J. McIntosh, C. H. Toy.

Ocean City, N. J.—Ocean City Automobile Bridge Co., capital stock, \$250,000; incorporator, H. D. Moore.

Philadelphia, Pa.—General Auto Co., capital stock, \$50,000; to deal in motor cars; incorporators, F. A. Kuntz, F. S. Murray, F. S. Sauerman.

Poughkeepsie, N. Y.—A. B. Mfg. Co., capital stock, \$200,000; motor car business; incorporators, M. M. Kotzen, J. Lichtenstein, R. H. Raphael.

Poughkeepsie, N. Y.—Kirchner Motor Co., capital stock, \$2,500; motor car business; incorporators, Otto Kirchner, C. Kirchner, J. E. Townsend.

Shelby County, Tenn.—Fiat Motor Car Co., capital stock, \$20,000; incorporators, O. C. Fleimner, E. Taylor, H. O. Bell, J. E. McCadden.

Toledo, O.—Peerless Rubber and Tire Co., capital stock, \$10,000; to deal in motor car tires and accessories; incorporators, R. G. Wierman, H. F. Hickman, E. Unsblatter, J. R. Humphrey, W. B. Woods.

Utica, N. Y.—Whitesboro Motor Car and Garage Co., capital stock, \$1,000; incorporators, J. W. Rogers, M. G. Malsan, A. S. Malsan.

Manufacturers' Communications

ROSE LITIGATION

PHILADELPHIA, Pa.—Editor Motor Age—Our patent rights, and our purposes and policy regarding them are clearly established and defined and are generally known, but in view of false reports which are now being circulated we make the following statement:

We originated both rear and front license brackets for motor cars and have basic patent rights concerning them which we must and shall always vigorously maintain to protect our customers against imitations of our goods, offered at cut prices.

We brought one suit in the southern district of New York against thirteen nominally distinct defendants, including Emil Grossman and his numerous allied corporations. Each and all of said thirteen defendants filed a demurrer, admitting infringement of all of the eight letters patent in that suit. In view of such admissions we have on May 14, 1912, brought an additional suit against Emil Grossman and his colleagues, including Emil Grossman Co., Eclipse Specialty Co., National Sales Corporation, Motor Car Equipment Co., Gus Balver Co., American Auto Supply Co. and Lowe Motor Supplies Co. for a larger amount of damages than was claimed in the first suit, and shall vigorously prosecute the same.

We included Lowe Motor Supplies Co. in another suit against Cox Brass Mfg. Co., but in view of the evidence and admissions made by the latter defendant that it made and sold the imitations of Neverout brackets which were resold by Lowe Motor Supplies Co. we chose to prosecute the Cox Brass Mfg. Co. alone in that suit, and moved the court to dismiss that bill against the Lowe Motor Supplies Co., but that judgment will be binding upon the latter. We included Thomas Harper in a suit against the American Auto Supply Co. Since bringing that suit we have secured additional patent rights which have since been infringed by the American Auto Supply Co., but we have the written assurance of Mr. Harper that he terminated his infringement before said suit was brought and will continue to respect our patent rights. Therefore we moved the court to dismiss that suit against both parties, but have included the American Auto Supply Co. in said additional suit charging infringement of our later patent rights.

We are vigorously prosecuting the suit against the E. A. Whitehouse Mfg. Co. and the Le Compte Mfg. Co. in the district of New Jersey. As both of these defendants admitted infringement and a decision was rendered against them on demurrer, such of the thirteen defendants in said

New York suit who have been selling the Whitehouse and LeCompte brackets will be bound by the decision in the New Jersey case. Therefore, in accordance with our policy, we shall suspend such proceedings against the colleagues of the manufacturers while continuing the prosecution of the latter. We brought one suit in Ohio against Eberhard Mfg. Co., Pennsylvania Rubber and Supply Co., Perkins-Campbell Co. and M. and M. Co. All defendants filed demurrers, thus admitting infringement of all the six letters patent in that suit, and, as the Eberhard Mfg. Co. admits it is responsible for the infringing articles sold by the Perkins-Campbell Co., we have suspended action against the latter while prosecuting the manufacturer.

The Eberhard Mfg. Co., having obtained patent No. 1,001,459 in the name of its employe, W. A. Schleicher, pretended that it had the right to manufacture infringing articles under that patent. However, in view of a statement sworn to by W. A. Schleicher and filed in the patent office by the attorneys for Eberhard Mfg. Co., a judgment was rendered in the patent office on April 25, 1912, to the effect that our E. M. Rosenbluth was the original and sole inventor and that said patent was illegally obtained in the name of William A. Schleicher. It is one of the duties of the legal department of the

United States to bring suit against any party who illegally obtains letters patent of the United States and that case is in the hands of the district attorney for the northern district of Ohio.

Therefore we warn the trade that the soothing assurances of the infringing manufacturers that our suits for infringement are merely for advertising purposes are absolutely false and in fact denied by the official records of the courts in which the several suits are pending, and, although our policy is to have as little litigation as possible, we shall bring additional suits whenever and wherever we fail to secure an amicable recognition of our rights in the premises.—Rose Mfg. Co.

WEIGHTS TIRES SHOULD CARRY

New York—Editor Motor Age—In spite of the fact that overloading is one of the most destructive influences to which tires can be subjected, it is a question whether one owner in ten has any idea of the weight his tires were designed to carry.

Experiments have proved conclusively that the life of overburdened tires is considerably shorter than it is where the designated carrying capacity is not exceeded. Therefore, the direct effect of overloading is to increase tire expense.

In order that motorists may know exactly how much of a load they have a right to expect their tires to carry our service bureau recommends the following table of weights in relation to tire sizes:

Size	Rear Weight, per Wheel, Pounds	Front Weight, per Wheel, Pounds
28x2 1/2	225	275
28x3	350	425
30x3	375	450
32x3	375	450
28x3 1/2	425	500
30x3 1/2	450	550
31x3 1/2	475	575
32x3 1/2	500	600
33x3 1/2	525	625
34x3 1/2	550	650
36x3 1/2	600	700
30x4	625	750
31x4	635	775
32x4	650	800
33x4	675	850
34x4	700	875
35x4	735	885
36x4	750	900
40x4	850	1000
42x4	900	1050
32x4 1/2	750	950
34x4 1/2	900	1125
35x4 1/2	935	1175
36x4 1/2	975	1225
37x4 1/2	1010	1260
38x4 1/2	1050	1300
42x4 1/2	1200	1450
34x5	950	1200
35x5	1000	1250
36x5	1050	1300
37x5	1100	1350
39x5	1200	1450
43x5	1400	1550
37x5 1/2	1150	1400
38x5 1/2	1200	1450

The pertinent fact about overloading is that it breaks down the side walls of the casing, laying the foundation for a blow-out which is bound eventually to occur. By the time this happens the casing is so badly damaged that it is beyond repair.—United States Tire Co.

VEHICLES STOP FOR STREET CARS

Montreal, May 29—The by-law which says that drivers of every kind of vehicle must come to a standstill 10 feet behind a stationary street car looks like the king pin of the numerous traffic by-laws put into effect since the traffic situation was first considered seriously in Montreal. It has been with a good deal of difficulty that Chief Campeau's traffic squad has succeeded in making the by-law understood, but the men on the busy transfer corners have devoted themselves almost solely to the new by-law since May 1, with the result that at the present time they have the carters and chauffeurs throughout the city pretty well educated, and one can now board a car with a certain degree of safety.

In order to educate the carters to this new order of things it has been necessary to bring dozens of them to court, and hardly a day passes that there are not a half dozen of them before the recorder for neglecting to observe the by-law. In every instance a fine has been imposed.

In consequence of the rigid enforcement of the new tariff by-law with the certain levying of a fine if disobeyed, the carters and chauffeurs are learning to thoroughly respect it, much to the increased safety of passengers on the street cars.